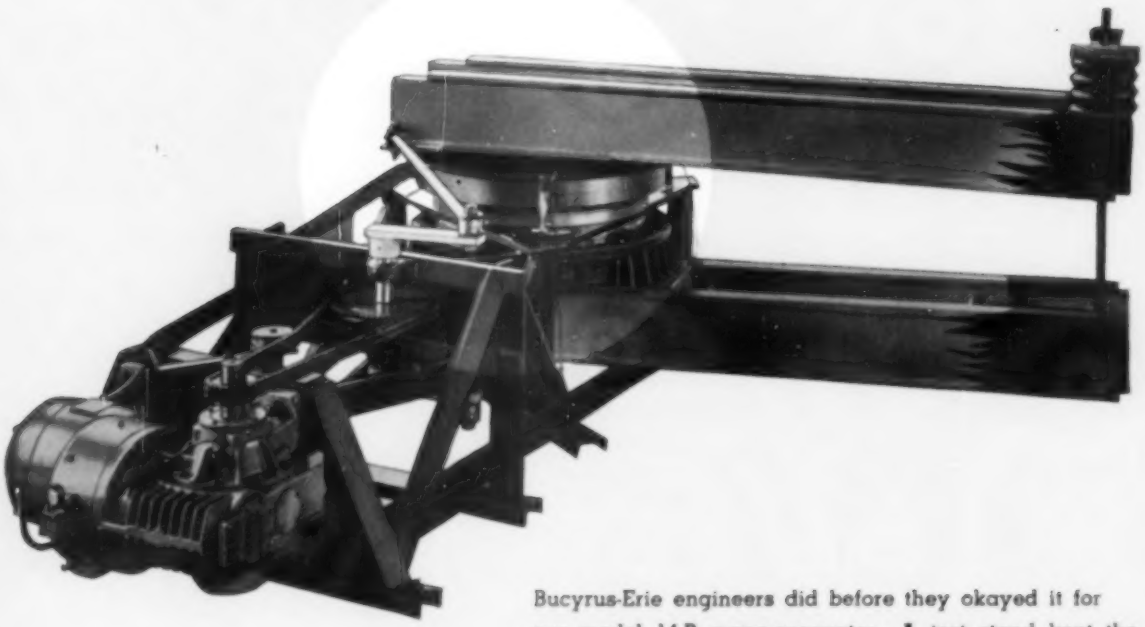
Excavating Engineer

founded 1905

JULY 1960

Traffic on the George Washington Bridge streams by as a 2½-yd. shovel makes the cut for a vehicular tunnel leading to the new lower deck of the bridge. A feature story begins on page 10.

ever try to make a ball bearing swing circle say "uncle"?



Bucyrus-Erie engineers did before they okayed it for our model 14-B crane-excavator. A test stand kept the swing circle moving back and forth under a measured load at a rate of 10 cycles per minute — day and night, week-ends and holidays. It took 1½ years to test 6 ball bearing swing circles. Sample segment of test: 42,600 maximum lift loads. The total testing program for just this one swing circle took 2½ years. Bucyrus-Erie doggedness like this gives you the most machine for your money. Today's 14-B swing circle is sealed and pre-lubricated at the factory. It's so friction-free that you can push the boom by hand. See your local distributor for the full scoop on any machine in our line.

38E60

BUCYRUS-ERIE

South Milwaukee, Wisconsin

Advertisers

IN THIS ISSUE

Allis-Chalmers 46–47
American Steel & Wire Div., U. S. Steel Corp. 8–9
Bucyrus-Erie Co. 2nd Cover, 13, 16, 35, 52–53, 56, 62–63
Caterpillar Tractor Co. ..... 2–3, 4th Cover
Cleveland Trencher Co. 48
Columbia-Geneva Steel Div., U. S. Steel Corp. 8–9
Drake-Williams Mount 69
Easton Car & Construction Co. 39
Eimco Corp., The 50
Electric Steel Foundry Co. 17–18
Ellicott Machine Corp. 57
Euclid Div., General Motors Corp. ..24–25
For Sale (Classified) 65, 66–67, 68–69
General Motors Corp., Euclid Div. ..24–25
H&L Tooth Co. 61
Hendrix Mfg. Co. ..... 3rd Cover
Ingersoll-Rand Co. 64
International Harvester Co. 36–37
Kano Laboratories 70
Koehring Div., Koehring Co. 42–43
Lone Star Steel Co. 68
Marion Power Shovel Co. 5
Morse-Starrett Products Co. 54
Saverman Bros., Inc. 49
Tennessee Coal & Iron Div., U. S. Steel Corp. 8–9
Trinity Dam Contractors 67
United States Steel Corp. 8–9
United States Steel Export Co. 8–9
Wellman Engineering Co., Williams Bucket Div. 55
Westinghouse Electric Corp. 6–7
Whitmore Mfg. Co. 58
Williams Bucket Div., Wellman Engineering Co. 55

Excavating Engineer

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South Milwaukee, Wisconsin

CONTENTS

Volume 54 No. 7 **July 1960**

Contractors Revamp the George Washington 10
Double-decking of the big suspension bridge across the Hudson plus new approaches at both ends will revitalize traffic between the northern end of Manhattan Island and New Jersey.

New York Approaches Remade in Stages 19
Amidst bridge's heavy traffic, contractors go ahead with a half-dozen major jobs.

Cut-and-Cover Tunnels Lead to New Lower Deck 26
On the New Jersey side of the George Washington Bridge, tunnels which will lead into the new lower deck are being dug through the Palisades traprock by cut-and-cover methods. George M. Brewster & Son, Inc., Bogota, N.J., has the $7.8 million contract.

New Gateway to Royal Gorge — by Ray Day 31
Colorado contractor adopts big-shovel technique to dig red granite highway cuts.

Jungle Busters Shape Island Paradise 38
Small task force of high-output machines clears the way for a luxury-type community on a jungle-like island just 15 minute's drive from Miami, Fla.

Rippers Help 'Rocket' Schedule — by Floyd Suter Bixby 44
In month's time, contractor cuts down large knob of granite at rocket testing site.

News from the Field 48
Chicago to Extend Navy Pier 48
GM's Euclid Div. Gets New Head 49
Job-Built Mole Bores Sand Tunnel 49

Equipment You Ought to Know About 54

Not in the Contract 60

Notes from the Manufacturers 69

New Trade Literature 70

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MILE-HIGH CALIFORNIA ROAD JOB

NEW TRACTOR-REALLY

Packs it in—two D8H Tractors, pulling and pushing, fill a 491 Scraper with hard-to-load breccia, a cemented gravel, in 45 seconds.

SCRAPER TEAMS PRODUCE

"A GOOD COMBINATION FOR THE ROUGHEST WORK"

TAKE boulders, volcanic ash and mud—mix well with decomposed shale—then add mile-high working altitudes, side-hill operation and unfavorable weather . . . these are some of the problems facing A. Tiechert and Son Inc. as they push a new highway through the Sierra Nevada Mountains in Eastern California. The job, 7.8 miles of freeway construction on State Highway 40, involves moving two million yards of earth in two five-month seasons. In spite of the obstacles, the Sacramento contractor holds the work to schedule, expects to complete the job on time this October.

Four D8 Series H Tractor-491 Scraper teams, push-loaded by D8s of the same series, set the pace for this difficult job. Because of the steep hill haul roads, they start the cuts and fills, then handle earthmoving on hauls up to 700 feet. DW21 wheel units take over on the longer hauls that range up to 7000 feet.

"The 491 Scrapers with D8s front and rear performed very well—especially in wet, rocky ground," says W. W. Staring, Project Manager. And he adds, "Operators and foremen especially like the 491 in rock because of higher apron clearance, excellent ground clearance and the good distance from axle to apron. In most cases we used D8-491 teams instead of shovels on shot breccia. It's a good combination for the roughest work."

On rugged big volume, short haul operations like this, Caterpillar track-type Tractor-Scraper combinations are the most efficient way to move earth. The new D8 Series H, for example, is over two tons heftier than the previous model, packs 23% more horsepower (235 flywheel HP), and with direct drive has a speed of 6.3 MPH forward. Team it with the 491 Scraper (34 cu. yd. heaped, 27 cu. yd. struck) or the 463 Scraper (28 cu. yd. heaped, 22 cu. yd. struck) for big capacity loads.

The finished product—traffic moves with speed and safety over a newly completed section of California State Highway 40.

Get all the facts—plus a profit-proving demonstration—on the new Caterpillar D8H Tractor and the 491 Scraper from your Caterpillar Dealer. He's ready right now!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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BORN OF RESEARCH
PROVED IN THE FIELD

WHAT HAPPENS WHEN A NATION SPENDS MORE ON GAMBLING THAN IT SPENDS FOR HIGHER EDUCATION?

If you can find any Romans around, ask them. They lived pretty high on the hog in their day. That is, until some serious-minded neighbors from up North moved in. The rest is ancient history.

You'd think their fate would have taught us a lesson.

Yet today we Americans spend twenty billion dollars a year for legalized gambling, while we spend a niggardly four-and-a-half billion for higher education. Think of it! Over four times as much! We also spend six-and-a-half billion dollars a year for tobacco, nine billion dollars for alcoholic beverages, and billions more on other non-essentials.

Can't we read the handwriting on the wall?

Our very survival depends on the ability of our colleges and universities to continue to turn out thinking men and women. Yet today many of these fine institutions are hard put to make ends meet. Faculty salaries, generally, are so low that qualified teachers are leaving the campus in alarming numbers for better-paying jobs elsewhere.

In the face of this frightening trend, experts estimate that by 1970 college applications will have doubled.

If we are to keep our place among the leading nations of the world, we must do something about this grim situation before it is too late. The tuition usually paid by a college student covers less than half the actual cost of his education. The balance must somehow be made up by the institution. To meet this deficit even the most heavily endowed colleges and universities have to depend upon the generosity of alumni and public spirited citizens. In other words, they depend upon *you*.

For the sake of our country and our children, won't you do your part? Support the college of your choice *today*. Help it to prepare to meet the challenge of tomorrow. The rewards will be greater than you think.

It's important for you to know what the impending college crisis means to you. Write for a free booklet to HIGHER EDUCATION, Box 36, Times Square Station, New York 36, New York.

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This is a picture of the solution for an unusual problem—involving a 160-foot boom, the world's largest on a quarry shovel.

A "special," it typifies Marion's ability and willingness to go to unusual lengths to solve customer problems.

The machine is a Marion 5323 which carries an 11-yard dipper, 95-foot handle and 160-foot boom to deal with a rocky bank ranging up to 135 feet in height. This machine's ability to dump 326 feet away from the wall made it the ideal answer to this big quarry's problem.

Why not let Marion specialists take an imaginative look at your quarrying and mining needs?

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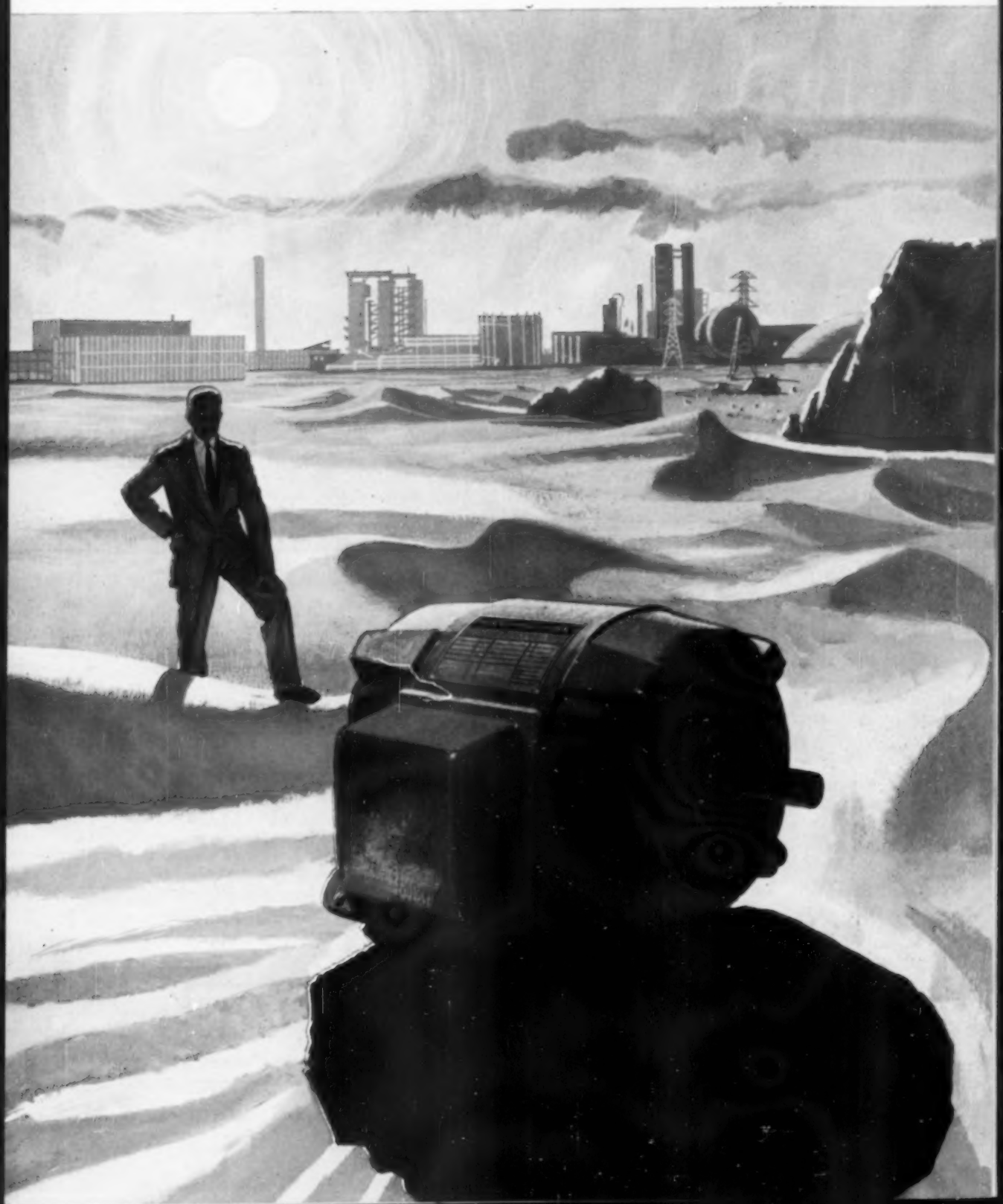
New Guardistor

THE MAN & THE MOTORS



FROM WESTINGHOUSE

Guardistor motors let you match the full capability of the motor to the job— with complete safety—absolute confidence

Our Marketing Manager says:

- "You can match the motor to the load . . . use all the motor you are paying for.
- Provides positive protection based on winding temperature . . . *not* load current and/or power supply fluctuations.
- Eliminates time and expense of changing winter-summer heaters. No nuisance tripping, it's fail-safe . . ."

Our Engineering Manager says:

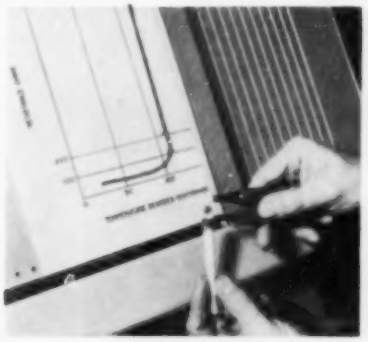
"With the breakthrough development of the Westinghouse Positive Temperature Coefficient thermistors, for the first time we can provide inherent protection against motor failure caused by excessive heat. The solid-state thermistors buried in the windings instantly sense excessive heat from any cause and simultaneously warn of trouble or automatically take the motor off the line. Thus, motor protection is placed where only true motor protection can be . . . in the windings."

Call your Mr. Westinghouse for the application of a Guardistor* motor to your drive requirements . . . write for *Questions and Answers About . . . Guardistor* (B-7876). Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

*Trade-Mark

J-22160

Unlike remotely located sensing devices, PTC thermistors are buried in the windings of the Guardistor motor, instantly equating all temperature factors.



Ever alert PTC thermistors constantly totalize temperature, statically triggering an action *only* if critical temperature is reached.

MOTOR & GEARING DEPARTMENT

YOU CAN BE SURE...IF IT'S

Westinghouse

TUNE IN WESTINGHOUSE CBS TV RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

Pass the salt...

from 2,000 feet below Lake Erie

...a job for USS Tiger Brand

Fairport Harbor Mine of the Morton Salt Company showing skip hoist at left and processing plant at right.

Rock salt discharges from the skip into a hopper and then flows on to a conveyor leading to the processing plant.

Skip hoist equipped with two Tiger Brand wire ropes. Two skips operate simultaneously—one discharges at the top while the other loads at the bottom.

The deepest salt mine in the United States is located at Fairport Harbor, Ohio, about 25 miles northeast of Cleveland. It taps a vast bed of salt 2,000 feet below the surface and extending far under Lake Erie. This is the first mine of its kind built in this country in the last 25 years. The shaft is deeper than the height of the Empire State Building.

Geologists estimate that the high-grade rock salt in this location will last over 200 years. The Morton Salt Company of Chicago, developers of the mine, aim to produce about 500 tons of salt an hour. All of it will be used for industries in the East and Midwest and for spreading on highways and sidewalks in winter.

USS Tiger Brand Wire Rope forms the vital connecting link between the salt bed and the surface. Two huge skips, shaped like rockets, have a capacity of 16 tons each and make 31 trips per hour. They are hoisted at a rate of 1,380 feet per minute by two Tiger Brand 2⅛" dia. Special Mine Hoist Ropes 2,580 feet long. These ropes provide the strength, fatigue and abrasion resistance necessary for safe and economical service. To prevent corrosion from the salt, the ropes are thoroughly lubricated at the factory and are relubricated every month at the mine.

Why USS Tiger Brand is your best buy. Tiger Brand Wire Rope is designed by one of the industry's most capable staffs of wire rope engineers. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. When you buy Tiger Brand you get the right rope for the job. And your installation is no further away than a phone call from experienced American Steel & Wire field service representatives.

For more information, write American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

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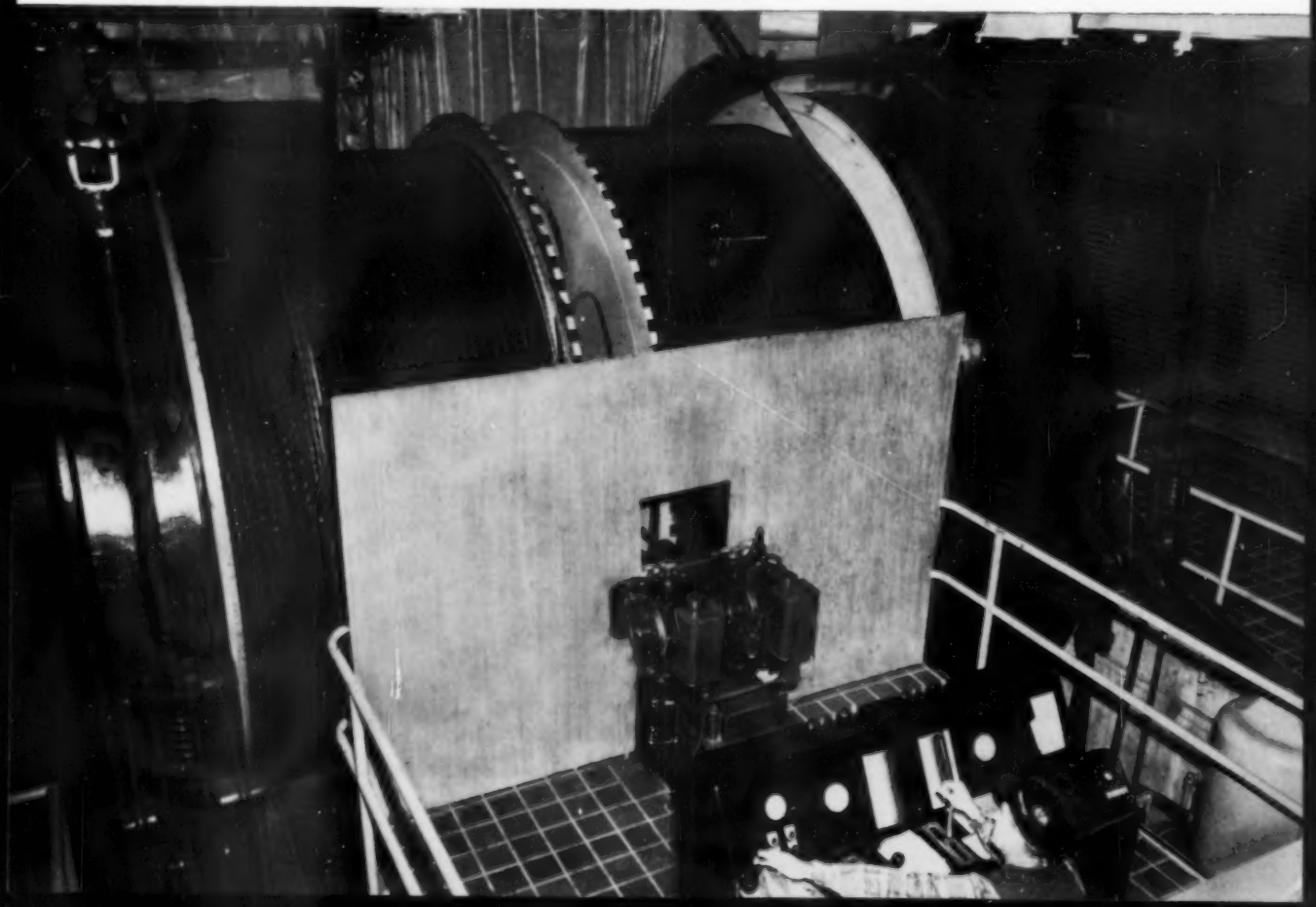
Wire Rope

USS Tiger Brand Wire Rope on the huge 12-foot diameter skip hoist drums. Skip operator can tell when skip is loaded by a series of different colored lights. Depth indicators show position of each skip.



Excavating Engineer

FOUNDED 1905

JULY 1960

Contractors Revamp the George Washington

Double-decking of the big suspension bridge across the Hudson plus new approaches at both ends will revitalize traffic between the northern end of Manhattan Island and New Jersey.

TO speed rush hour traffic flowing across New York's George Washington Bridge, a lower-level deck is being added to the big 4,760-ft. long structure. The well-known landmark spans the Hudson river between the upper end of Manhattan Island at W. 178th Street, and Fort Lee, N. J. It is operated as a toll facility by the Port of New York Authority.

The big suspension span is the only traffic artery across the broad Hudson north of the Lincoln Tunnel at W. 39th Street. (The next crossing is the Tappan Zee Bridge of the New York Thruway far up the river at Tarrytown.) So, the George Washington is heavily patronized by commuters who work in Manhattan but make northern New Jersey their bedroom. Fleets of interstate commuter buses and a continuous stream of commercial trucks also contribute to the traffic.

Records of the Port Authority show that over 35 million vehicles went over it in 1959.

Even with eight lanes, the big bridge can scarcely accommodate peak traffic loads in the early morning and late afternoon on working days.

Construction of the six-lane lower level to the bridge will increase its annual traffic capacity by 75%. The job was begun in 1959 and will take several years to complete. To improve traffic flow in connection with the double-decking, major alterations and additions are being made to the approaches to the bridge both in New York and New Jersey, including the 12-lane depressed Trans-Manhattan expressway between 178th and 179th streets in the Washington Heights area of Manhattan. In addition, a bus terminal is being built by the Port Authority over the new expressway to serve interstate commuter buses.

Total cost of all improvements, including land acquisition, is estimated at $183 million. All phases of the project will be completed by early 1962.

The complexity of the current project is underscored by the fact that the overall project will cost almost 2½ times as much as the existing bridge and its approaches. Total cost of the original facility, at the construction prices prevailing more than a quarter of a century ago, was $73,700,000.

The work confronts the Port Au-

Span Holds 3rd Place

Port Authority photo

thority with many thorny problems, some of which are without precedent. Building a new six-lane facility and its approaches—on the same alignment as an existing eight-lane route which must be kept operating at full capacity—is a task that requires top-notch engineering and contracting skill. Engineering personnel of the Port Authority spent many thousands of man-hours designing the new deck; preparing new approaches; and developing an operating plan for maintaining traffic during construction.

Design Consultant

O. H. Ammann, a senior partner of the distinguished highway-and-bridge engineering firm of Ammann & Whitney, was retained by the bi-state agency to serve as design consultant on the second deck. He was the original designer of the George Washington Bridge and was chief engineer of the Port Authority during the construction. The need for a lower deck was anticipated in Ammann's plans for the bridge, and engineering allowances were made for such an improvement in the original foundations, towers, cables and suspender system.

While the original design contemplated four rapid transit tracks on the lower deck, the present design (prepared under the direction of Irvine P. Gould, the Port Authority's design engineer for tunnels and bridges) is for six lanes of vehicular traffic. The problem facing the present designers was to incorporate these modifications without exceeding the design dead and live loads established 30 years ago.

Port Authority photo

A huge 200-ton truss section is lifted into position by powerful erection trolleys. Crews of Bethlehem Steel Co. pre-assemble each section and deliver them by river barge.

Representing the Port Authority as resident engineer on the project is Harry A. Druding. A prominent member of the agency's corps of experienced veterans, Druding's last assignment was as resident engineer in charge of the underwater construction of the $100 million Lincoln Tunnel third tube.

The second deck will be a truss fastened onto the bridge structure. According to Druding, very little modifications to the original deck are needed because of Bridge Designer Ammann's far-sighted planning. For instance, steel gusset connector plates for taking the truss numbers were built into the top deck at 60-ft. intervals along the 4,660-ft. section between the anchorages. The lower deck will be supported entirely through

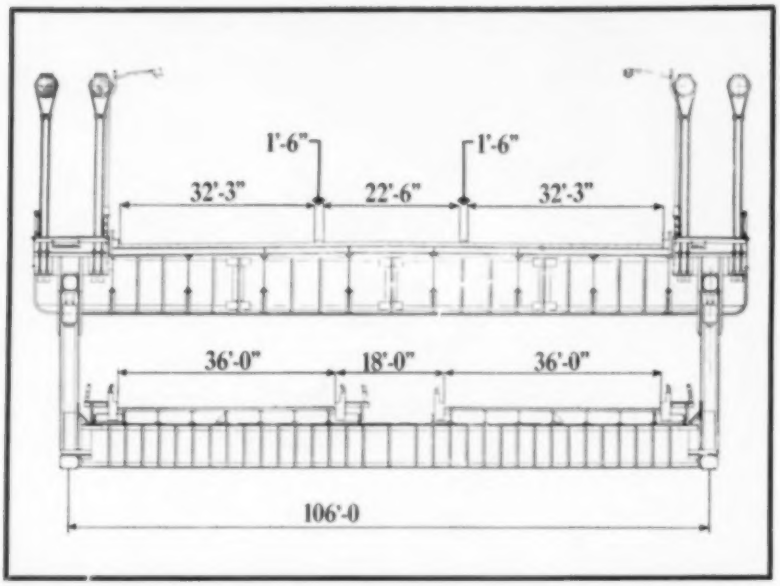
THIRD longest suspension bridge in the world, the George Washington Bridge spans the Hudson River to join upper Manhattan at W. 178th Street, with Fort Lee, N. J.

Center span of the bridge (3,500 feet between towers) is exceeded only by the 4,200-ft. center span of San Francisco's Golden Gate Bridge, and the 3,800-ft. center span of the Mackinac Bridge crossing the five-mile wide Straits that divide upper and lower Michigan.

The bridge's present eight traffic lanes make direct connections on the west with the arterial highways of northern New Jersey, the Palisades Interstate parkway and the northern terminus of the New Jersey turnpike. On the east, there are connections with the Henry Hudson Parkway, Riverside Drive, and city streets.

Length of center span	3,500 feet
Length of bridge between anchorages	4,760 feet
Width of bridge	119 feet
Width of roadway	90 feet
Height of towers above water	600 feet
Wire in four main 36-in. dia. cables	105,000 miles
Channel clearance of bridge at midspan	248 feet
Opened to traffic	Oct. 25, 1931
Cost of existing bridge and approaches	$73,700,000*

*Figure does not include current work



Drawing shows how the lower deck is supported through the connection of vertical stiffening-truss members to gusset plates built into existing deck. Four giant 36-in. diameter cables carry top deck. Original bridge design provided for extra deck.

the connection of new stiffening-truss members, both vertical and diagonals, to these gusset plates.

The new deck will be supported by 7-ft. deep floor beams on 30-ft. centers that carry 24-in. wide-flange stringers spaced on 5½-ft. centers. The deck will carry two roadways, each 36 feet wide. The roadways will have an open-grid type flooring filled with lightweight aggregate concrete.

Sufficient dead load weight savings were achieved through the reduction in floor beam spacings and the lightweight floor to stay within the originally contemplated design dead load. Additional weight saving was achieved in some of the structural members by using a high alloy steel.

Minimum Clearance

Minimum clearance height for vehicles will be 15 feet. The completed double-decked span will have a 204-ft. clearance above the Hudson.

Bethlehem Steel Co. has the contract to furnish and erect 13,875 tons of structural steel at a cost of $13,610,000. Preliminary work on the upper deck in preparation for fastening on the lower level was completed last year. Erection of big prefabricated steel sections of the deck, whose delivery was delayed by last year's steel strike, began in January.

Resident Engineer Druding emphasizes that ground rules for all operations of contractors on the project are set on the proposition that traffic must go through.

Bethlehem's contract specs call for no interruption to traffic except for the occasional use of one of the outside lanes on the upper deck for delivery of miscellaneous supplies, and for transporting workmen to their jobs. Even this concession is restricted to certain hours when bridge travel is light.

Bethlehem's iron workers will lift each huge 200-ton steel deck assembly by means of powerful erection trolleys. These are traveling platforms complete with hoisting engines, power tools and other equipment. The trolley system operates something like a factory overhead crane. Its wheels ride on a set of temporary I-beam tracks mounted along the underside of the existing upper deck.

The trolleys lift the preassembled sections from each shore and from barges anchored in the river directly below the bridge. Erection is pro-

Continued on page 14

Lower level will be a truss fastened to the bridge structure. Sketch shows how it will appear beneath the present upper deck.

...new ideas put this crane in a class by itself!

Reach in or up under full load or in combination with hoist. Hydraulically telescoping boom "reaches" from 37 to 50 ft. Ten-ft insert and 10- or 20-ft jibs available.

Telescoping boom rolls on anti-friction bearings.

Hydraulic outriggers (optional extra) set in seconds.

Boom retracts to 25 ft for over-all travel length of 35 ft, 9 in.

introducing the NEW Bucyrus-Erie 11-BH

New 11-BH Transit Crane, with telescoping boom, converts to dragline or clamshell (hydraulic or 2-line mechanical) . . . has 12-ton lifting capacity . . . will handle loads in tight spots you never thought possible.

The new 11-BH lets you hustle out in jig time, set up in seconds, pick up a load and thread it through tight spots you couldn't get close to with any other machine! Its telescoping boom is the big difference. You save time because you have no boom sections to remove. You save more time because hydraulic outriggers set quick and easy. See your Bucyrus-Erie distributor or write to Bucyrus-Erie Company, South Milwaukee, Wisconsin, for the complete story.

34E60

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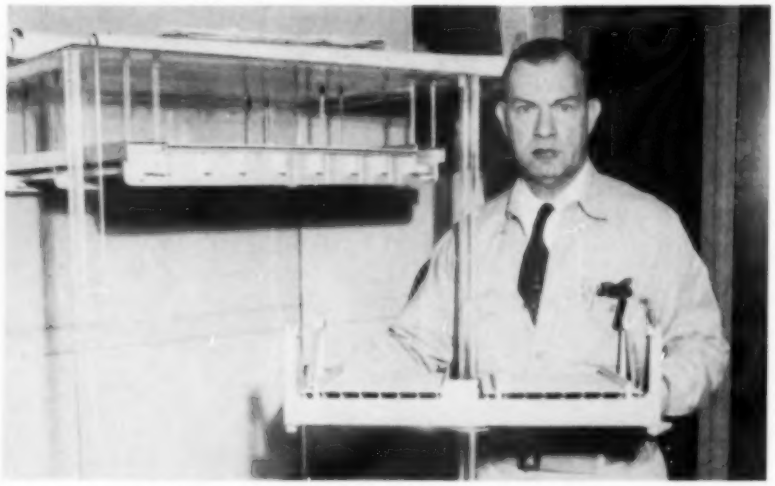


Harry Druding, resident engineer on the bridge project for the Port Authority, holds a plastic and aluminum scale-model of one of the big 200-ton steel deck assemblies.

Bridge . . .

Continued from page 12

ceeding simultaneously from both sides of the river and will meet at center.

A typical truss section is 60 feet long, 108 feet wide and 30 feet deep. In all, there will be 76 such prefab sections erected. At each connection point, the truss section will be raised into fitting position and temporarily bolted into place. Later permanent rivets will be installed.

C. E. Adam is field superintendent for Bethlehem Steel Co. James Sterner is project manager. G. P. Adair is manager of erection of the firm's New York district.

While the steel erection is the most spectacular part of the bridge revamping show, the approach structures on both banks of the Hudson are equally complex and far more costly.

All major contracts for various segments of the New York and New Jersey approach systems are now well underway.

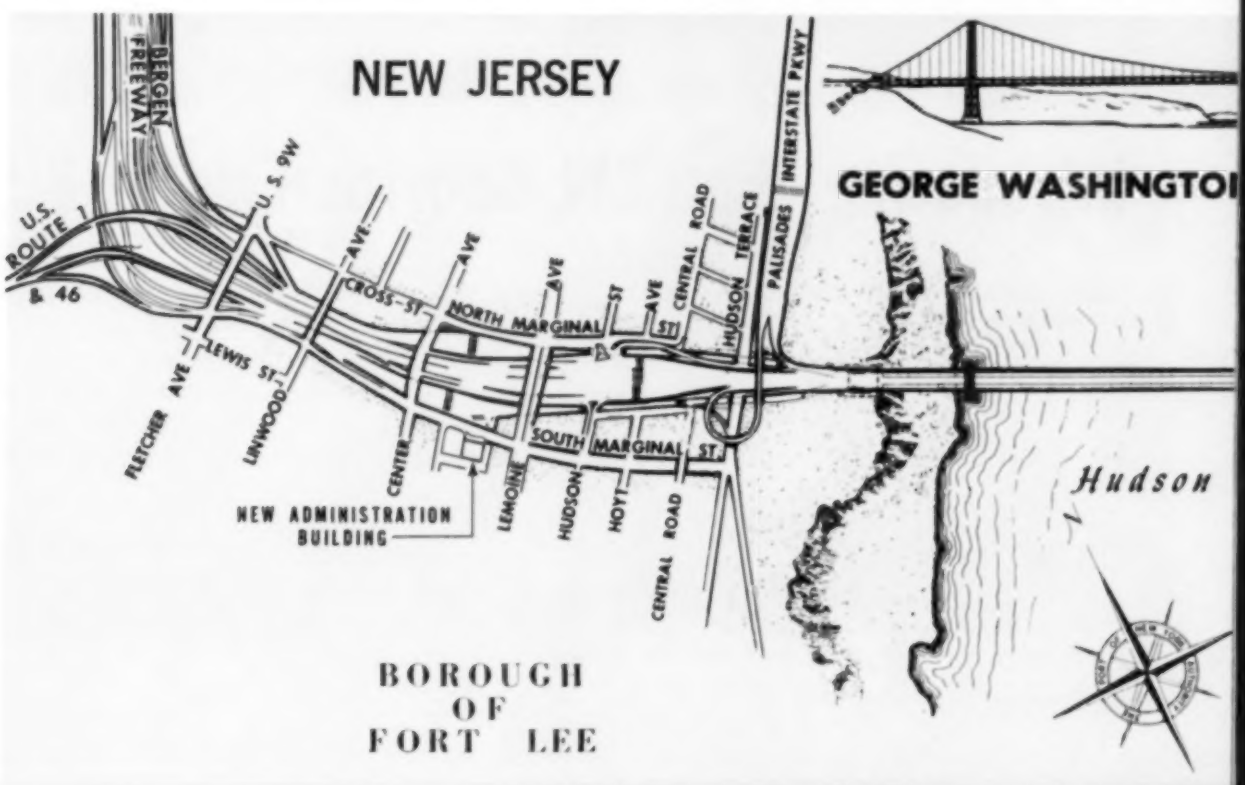
Excavation for the 12-lane depressed Trans-Manhattan expressway, extending eastward across Manhattan from the big bridge to the Harlem river between 178th and 179th streets, has been completed. This new route for through traffic will connect the George Washington Bridge with the new Alexander Hamilton Bridge across the Harlem river, to be built by the state of New York. The Alexander Hamilton will lead to major arterial highways in the Bronx. Foundations for the $13 million Port Authority bus terminal, being built over the depressed expressway in the blocks between Fort Washington Avenue and Wadsworth Avenue, are in place and work is starting on the terminal itself.

New bridges are also being built to carry local traffic of such streets as Broadway and St. Nicholas Avenue over the wide expressway.

The expanded New York approach system which will link both the upper and lower levels of the bridge with parkways and city streets is detailed in a separate story. Another feature describes work on the New Jersey side where a pair of three-lane tunnels through the Palisades are being constructed by "cut-and-cover" method.

Bi-state Agency

The Port of New York Authority, which owns and operates the George Washington Bridge, is an agency of the states of New Jersey and New York. It is responsible for the development and operation of transportation and terminal facilities in the port



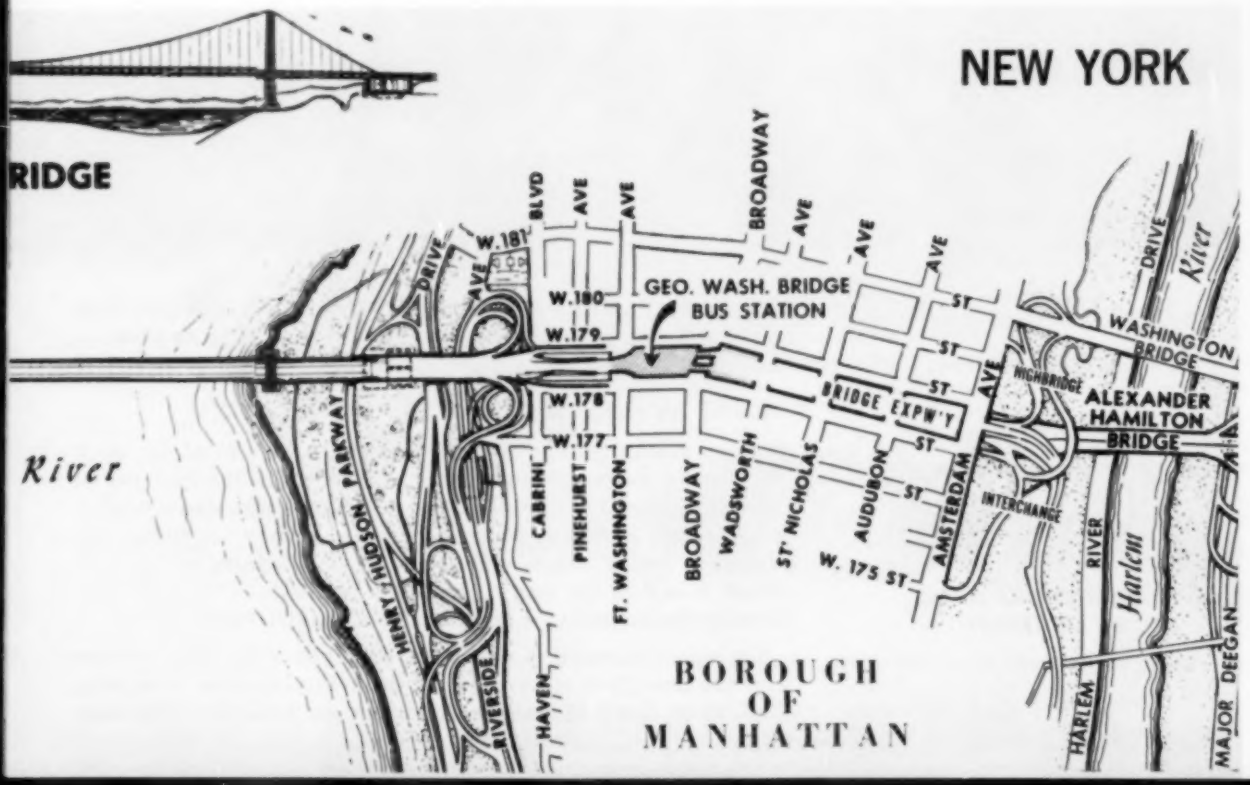
Major Contractors — Bridge Project

Contractor	Description of Work	Date	Amount of award
Bethlehem Steel Co. Bethlehem, Pa.	Furnishing and erecting 13,875 tons of steel for lower deck	June 19, 1958	$13,610,298
George A. Cosman Wrecking Co. Jersey City, N. J.	Removal of 82 structures in Manhattan approach area	Oct. 10, 1957	1,160,000
Gull Contracting Co. Flushing, N. Y.	Ramps connecting upper and lower levels of bridge with Manhattan parkways and streets	Aug. 14, 1958	1,717,370
Gull Contracting Co.	" "	Jan. 8, 1959	1,882,930
Gull Contracting Co.	" "	June 11, 1959	1,992,760
Tully & DiNapoli, Inc. Flushing, N. Y.	Bridge exit ramps in Manhattan	Mar. 15, 1959	1,040,250
Johnson, Drake & Piper, Inc. New York City	Lower level roadway from bridge anchorage in Manhattan to Cabrini Blvd.	Feb. 11, 1960	1,254,400
Brookfield Construction Co. New York City	Two sections of Trans-Manhattan expressway between Cabrini Blvd. & Wadsworth Ave.; foundations of bus terminal facility	Dec. 11, 1958	6,708,333
Johnson, Drake & Piper, Inc.	Section of Trans-Manhattan expressway between Wadsworth & Amsterdam Avenues; three grade separation bridges	May 27, 1959	5,511,693
Tully & DiNapoli, Inc.	Relocation of marginal streets in Fort Lee, N. J.	Oct. 9, 1958	892,472
George M. Brewster & Son, Inc. Bogota, N. J.	Lower level approach roadways and tunnels in Fort Lee	Mar. 15, 1959	7,840,653
George M. Brewster & Son, Inc.	Lower level approach roadways west of bridge plaza	Feb. 11, 1960	3,883,843
Peter W. Kero Co., Inc. Carlstadt, N. J.	Relocation of marginal streets in Fort Lee	May 14, 1959	995,161
Rusciano Const. Corp., & Del Balso Const. Corp. Pelham Manor, N. J.	Lower level roadway and toll plazas; revisions of existing streets and bridges; approach ramps; utilities installation	Sept. 10, 1959	3,640,965

district—an area within a 25-mile radius of the Statue of Liberty.

Within the port district live 13 million people, or about 9% of the total population of the United States. The entire Port Authority system is operated on a self-supporting basis without cost to the taxpayer. The Port Authority's investment in public air, land and sea transportation and terminal facilities at the present time amounts to close to a billion dollars. It operates such facilities as the Lincoln and Holland tunnels; airports, including New York International, LaGuardia and Newark; major bridges; a large complex of marine piers and warehouses; and bus, truck and railroad freight terminals.

Chairman of the Board of Commissioners of the Port Authority is S. Sloan Colt. Austin J. Tobin is executive director of the Port Authority, and John M. Kyle is chief engineer.



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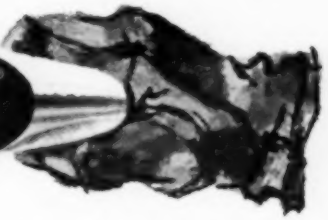

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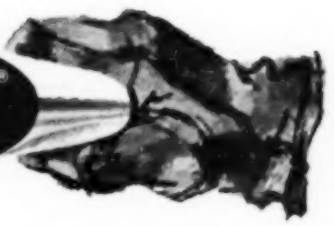


LITHO IN U.S.A.

New York Approaches Remade in Stages

Amidst bridge's heavy traffic, contractors go ahead with a half-dozen major jobs.

A 2½-yd. P&H shovel, owned by Tully & DiNapoli, Inc., rips out sidewalk and street pavement. Debris is hauled across the bridge to the New Jersey side for disposal.

NEW YORK'S approaches to the bridge are a beast of a construction problem. We will have to remake completely all existing roadways and ramps, and change traffic flow patterns as we go along.

Harry Druding, resident engineer in charge of the overall expansion of the George Washington Bridge for the Port Authority, summed up in those words the multi-million dollar complex of contracts now underway in the Fort Washington area of upper Manhattan.

"The stream of traffic constantly flowing through the area makes it difficult for the Port Authority to stage the work and for contractors to carry out each phase," he said. "If there were no traffic, there would be no problems.

"Our design engineers put a good deal of time and study into setting up the stages" he said. "They took many factors into consideration including the prime criteria that traffic flow should not be impeded by the construction and the total volume of traffic maintained at all times."

Then, there was the problem of breaking up each contract section to

A block-wide excavation at the Manhattan approach to the bridge makes room for the new 12-lane depressed Trans-Manhattan expressway leading into the bridge. Shown here on the $6½ million section of Brookfield Construction Co. is a truck crane erecting concrete forms for a 30-ft. high retaining wall. A $15 million bus terminal will be built above the roadway.

(Above) Steel ramps are erected on Tully & DiNapoli contract. (Left) While traffic whizzes by, a Link-Belt crane puts concrete deck on new ramp built alongside the upper deck.

arrive at a fair distribution of problems among the firms working for the Port Authority. The Port Authority also had to vary the size of contracts to get competitive bidding through use of smaller contractors and some of the bigger ones.

Before any contracts were let, detail phasing plans were developed for both the New York and New Jersey approaches. These plans established by date the flow of traffic through each contract area as well as delineating the specific areas and sequence of construction at that time. These plans were reviewed in detail by the operating staff of the Port Authority to assure familiarization of the problems to be encountered by the operating personnel in coordinating traffic with construction. Where necessary, additional limitations were imposed on lane usage to avoid congestion in peak hours.

Night Work

Frequently, work on critical facilities was scheduled at night when traffic could be detoured around the construction. As each contract was developed, specific phasing was set forth in the specifications together with lane usage limitations, erection procedures, and other traffic control measures to assure full adherence to the planned program.

Druding pointed out there are many transitions on the New York side with traffic directed in various directions. The present facilities are plagued with hairpin curves—some ramps turn 90° and 180°. These must be eliminated and replaced with turns of reasonable radii. Various entrance points where motorists can get on the bridge must be connected in concentric patterns. Also traffic must be directed into the new Trans-Manhattan expressway.

Traffic density is 85,000 vehicles in 24 hours, according to Port Authority records. Since there are two

A major feature on the Gull Contracting Co. job is a half-mile long viaduct providing a gently curving exit from both levels of bridge to Riverside Drive and Hudson Parkway. Concrete columns, some 75 feet high, support prestressed box girders.

Sketch of New York side shows complex ramps and viaducts designed to handle traffic moving between the bridge and arterial routes.

peak traffic hours with flow divided equally in both directions, it is impossible for contractors to remake one side of the bridge at a time.

As the work goes along, a huge amount of spoil and rubble from demolished structures is being produced. What to do with such material is a construction problem peculiar to Manhattan Island. There just aren't any vacant disposal sites. That means all waste material must be hauled from New York over the bridge to the New Jersey side in over-the-road 10-wheeler dump trucks.

The Port Authority has split up the New York job into more than a half-dozen contract sections. Sizes of the jobs range between $1 million and almost $7 million. Low bidders on these contracts were all metropolitan area firms.

Expressway Jobs

Brookfield Construction Co. has a $6.7 million contract for the first two sections of the depressed expressway from Cabrini Boulevard to a point beyond Wadsworth Avenue. The firm is also building the foundations for the $13 million bus passenger facility being built over the depressed expressway at Wadsworth Avenue.

Johnson, Drake & Piper Inc., is in charge of a 1,200-ft. section of expressway east of Wadsworth Avenue. Its bid was $5.5 million. Close to the bridge itself two contractors are working on ramp improvements. The firm of Tully & DiNapoli, Inc., is building a section of bridge exit ramps under a $1 million contract. Gull Contracting Co. has three contracts to build ramps connecting upper and lower levels of the bridge with Manhattan parkways and streets. All three Gull jobs total $5.6 million.

A major feature of Gull's work is a half-mile long reinforced concrete viaduct extending from 171st to 177th Street between Haven Avenue and Riverside Drive. The elevated highway will provide an exit from the bridge to the Henry Hudson Parkway and Riverside Drive.

The highway will be supported on circular concrete columns from 3½ to 6½ feet in diameter. Some of these columns are 75 feet tall. The columns are set on drilled-in-caissons, some of them carried down to 75 feet below ground to bedrock. Rock underlying the area is Manhattan schist.

"A unique method of setting concrete forms for the columns has been

Special forms were designed for Gull to pour concrete columns. Each form, consisting of four sections, was assembled flat on ground and raised on column base by crane.

(Above) A Bucyrus-Erie 30-B Transit Crane with 60-ft. boom and 30-ft. jib pours the 8-in. thick double reinforced deck slab. Ramp has a 24-ft. wide roadway from curb to curb.

Jimmy Gull (left), master mechanic for Gull Contracting Co., holds a job conference with Superintendent Olaf Pedersen. Jimmy visits all of his firm's New York jobs daily.

devised for us by Richmond Screw Anchor Co. in Brooklyn," said Charles Lose, Jr. who is construction engineer for Gull.

The method made it possible for Gull to put up forms for two columns during a day. Assembly of the form followed this procedure: First, reinforcing steel for the inside of the form was attached to the first of the four sides that form the box-shaped cast of the circular column. Then, the other three sides of the box were added, closing up the form. Finally, the entire assembly was brought together with bolts.

For lifting, a double bridle was provided in the middle of the form. The upper end of the form was raised to rest on a blocking 10-feet high; then Gull's workmen shifted the bridle so that the lifting crane could take hold of the form at its top. This enabled the crane to lift the form upright. The crane then traveled to the site of the column with the tall, heavy form hanging from its boom.

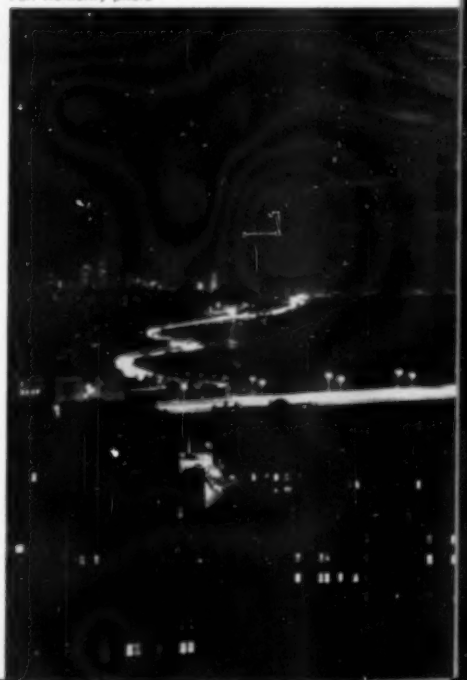
Next, the form was swung onto the column base. Workmen secured it from side sway and any other motion by guy wires strung in four directions. Steel dowels provided the connection between the foundation and the concrete casting for the column. These dowels, extending about 40-in. into the foundation, were 1¼-in. diameter.

The foundation itself consisted of heavily reinforced concrete all the way down to bedrock.

Successful use of these forms by the contractor made the job, according to Charles Lose.

The viaduct is supported longitudinally on prestressed box girders which vary in length from 60 to 70 feet. Precast concrete ribs are grouted in place, and concrete is placed between each rib. These ribs

Port Authority photo



Colonial Sand & Stone Co. supplies all concrete on the Gull job. Bridge in background will require 1,400 cubic yards. This big 1¾-yd. bucket is swung by a 51-B crawler.

(Above) Laydown bucket swung by crane places concrete in 7-ft. wide box girders.

are 1 foot wide, 2 feet deep and 30 feet long. An 8-in. concrete deck slab reinforced at top and bottom is placed on the ribs.

The deck has a 24-ft. wide roadway from curb to curb. A curb and crash-wall take up another two feet on each side. There is also a 4-ft. high side-wall on each side.

There are two bridges on the Gull contract which utilize post-tensioned design. One is 113 feet long; the other is 150 feet. Box girders for the post-tensioned bridges are 60 feet long, 7½ feet wide and 4 feet high. Each girder contains 60 strands of wire rope 7/16-in. diameter. Two post-tensioning tendons are cast into each girder.

Expansion Design

The girders were lifted into place by a pair of 50-ton cranes. The connection to the column was made with bearing plates. A fixed plate is located at one end of the girder, and an expanding one at the other. High-tension transverse rods were then installed.

Hydraulic jacks for the tensioning process were supplied by the Buffalo (N.Y.) office of Joseph T. Ryerson & Son, Inc., which worked out this technique.

A recent job of the Gull firm, also for the Port Authority, was the New York land section of the third tube of the Lincoln tunnel. This $10 million job lasted 4½ years.

The contracting firm is headed by four members of the Gull family. Andrew is president; Anthony, vice president; William, secretary and treasurer; and Jimmy, master mechanic.

The big 4,770-ft. suspension span, lighted by luminaires, is an impressive sight against the twilight sky. Lights of traffic moving on Hudson Parkway and Riverside Drive created the pattern in the left foreground. The Manhattan skyline is at upper left.

Another example of

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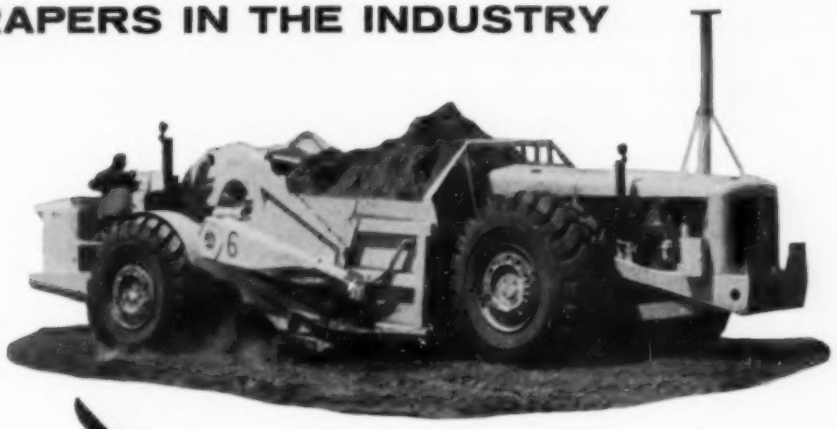

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Get all the facts and see how Euclid's Greater Dimension can bring a better return on your scraper investment.

Cut-and-Cover Tunnels Lead to New Lower Deck

On the New Jersey side of the George Washington Bridge, tunnels which will lead into the new lower deck are being dug through the Palisades traprock by cut-and-cover methods. George M. Brewster & Son, Inc., Bogota, N. J., has the $7.8 million contract.

TWO tunnels (each providing three traffic lanes) are being dug through the Palisades at Fort Lee by a "cut-and-cover" method. They are being built beneath the present bridge roadway as part of the expanded New Jersey approaches to the new lower deck of the George Washington Bridge. This rock excavation job amounting to 160,000 cubic yards is the toughest phase of the work being done by George M. Brewster & Son, Inc. Brewster has a comprehensive $7,840,653 contract for the construction of the lower level approach roadways between the bridge anchorage and Hoyt avenue.

The westbound tunnel (to New Jersey) will be approximately 630 feet long and the eastbound tunnel (to New York) will be about 550 feet long. They will lead to depressed roadways joining the new lower deck with the improved New Jersey bridge plaza.

In addition to the tunnels, the contract includes two new bridges on Hudson Terrace to carry north and south-bound traffic over the depressed roadways; widening of the north side of the existing main approach bridge over Hudson Terrace; construction of a short emergency ramp from the eastbound lower level roadway to Hudson Terrace; and the installation of utilities. Work is scheduled to be completed in the spring of 1962.

Location Of Tunnels For Lower Level Traffic To Be Cut Through The Palisades Beneath The Present Bridge Roadway (shown in white)

Port Authority photo

Adjacent to Bridge

Brewster's area of the New Jersey project is closest to the anchorage of the bridge. In adjacent areas a half-dozen other contractors are also busy modifying existing streets and adding new roadways.

The New Jersey approach was designed by the internationally recognized engineering firm of Ammann & Whitney of New York City.

The completed New Jersey approach system will provide connections with major routes through the new 10-lane Bergen county expressway. These routes include U.S. 1, U.S. 9W, U.S. 46, New Jersey 4, Palisades Interstate parkway and various local roads.

Essentially, Brewster's problem is this: How do you build six underground traffic lanes on the same align-

Hard traprock formation with many cleavages makes tough drilling. Crawl-IR drills are supplied with compressed air piped through aluminum lines from stationary units.

ment as an existing 8-lane facility which must be kept operating at full capacity?

"We are right in the middle of a hornet's nest," says Donald Totten, general superintendent for Brewster. "There's traffic around us constantly. It's hard even to supervise this job. There's no riding in pick-up trucks; it's all walking. In fact, we can't cross from one side of the job to the other without going back to an underpass on Palisades Terrace.

"Everytime we bring out a piece of equipment like a truck or crane on the busy roadway, the Port Authority must be notified in advance. Even then, we are only permitted to come out after 10 a.m. when the morning rush has subsided. The entire job isn't over a half-mile long, yet it costs over $7 million."

According to Totten, three main factors contribute to the difficulty of the job. These are the close tolerances demanded in line drilling; the lack of area in which to drill, blast and haul; and the stage work involved in keeping traffic moving.

While the cut-and-cover tunnels are being excavated on both sides, an 80-ft. wide traffic passage width must be maintained for the Port Authority at all times.

The tunnel cuts will be about 60 feet deep at maximum. Each cut will accommodate a 36-ft. roadway and a 3-ft. safety walk. A concrete conduit with 14-ft. clearance will be formed in each cut. It will have 8-in. walls and a 10-in. thick ceiling. Interior of the conduit will be finished with ceramic tile. The conduits will curve at a gentle 1,000-ft. radius around the great cable anchorages of the bridge which are sunk deep into the Palisades.

Stage Work

Extensive underpinning is needed while each conduit is dug underneath the existing upper deck roadway. Existing roadway structures are given temporary support supported on steel beams and columns; rock is then removed; and the new foundations put down to the lower elevation.

Construction of the conduits will follow a complex multi-stage procedure. Simplified, the typical plan goes as follows: First, one side of the cut will be excavated down to grade and support for the upper roadway installed. Next, the small portion of the opposite side of the cut will be excavated and support columns installed there. Then, a portion of the center of the cut will be taken out and the center support column installed. Finally, rock remaining on both sides of the center support column will be excavated down to grade and the roadways constructed. The

Working in a narrow cut, a 2½-yd. 54-B shovel loads blasted rock into a Koehring 7-yd. Dumptor for a short run to the crusher.

Manitowoc Speedcrane breaks oversize rock with headache-ball, then clams it out.

A 2½-yd. model 820 hoe scoops out blasted rock from a cut. In background are the existing toll booths for the upper deck. Depressed roadway will pass under local streets.

diagram on page 30 illustrates the various stages in the tunnel construction procedure as rock is removed to make way for six lanes of traffic.

The solid rock of the Palisades—diabase traprock—is a costly drilling proposition and a ticklish blasting problem. "It's the hardest variety of traprock I've ever seen," says Assistant Superintendent Ed Kennedy. "This is the toughest blasting job I have been on, and that includes being blasting superintendent on one of the biggest rock cuts for the New York Thruway in Yonkers.

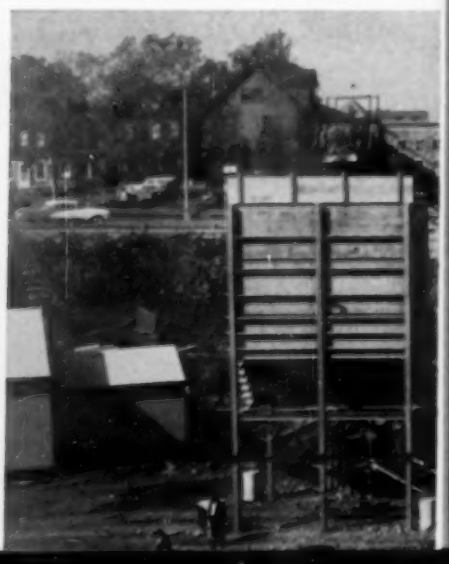
"The traprock here is not only the hardest variety but it is full of cleavages," he said. "These fractures in the rock formation make it tough for us to hold wall lines. There is a 3-in. tolerance on line drilling, so all our blasting and drilling must be precision controlled. Anytime we set off a shot, traffic must be stopped at both ends of the job. That means all blasting must be done between the hours of 10 a.m. and 3 p.m. to prevent tie-ups of morning and evening rush traffic."

To split the walls of the cut vertically before the mass of the rock is drilled and blasted, Brewster is using eight Chicago Pneumatic and Joy crawler drills that line-drill 2½-in. diameter holes on 24-in. centers. Small charges of explosive then presplit the vertical walls to keep to a minimum the amount of over-break beyond the neat lines of the excavation. This saves scaling and backfilling costs. Drills with 4 and 4½-in. drifters are used for larger-hole production drilling. Bits must be changed after about 40 to 50 feet of hole.

Air Pipelined

Air power for the drills comes from two Chicago Pneumatic 1,850-cfm stationary compressors. These fixed units are located in an off-side position on top of the bank above the work. Aluminum pipelines strung down the side of the cuts deliver the

(Left) Making a quick run from cut to the crusher, Dumptor end-dumps load. (Right) Conveyors lift the minus 6-in. material into hopper.



(Left photo) Resident Engineer F. H. (Dutch) Wernecke poses with Brewster's job superintendent, Don Totten. Wernecke is Port Authority supervisor on the New Jersey side. (Right photo) Asst. Supt. Ed Kennedy tells Foreman Herb Frazer all's well on job.

air to the drills. Several thousand feet of piping are being used on the job. Mainline is 6-in. diameter; 4-in. lines feed off the main. Supplementing the stationary units are three portable 600's.

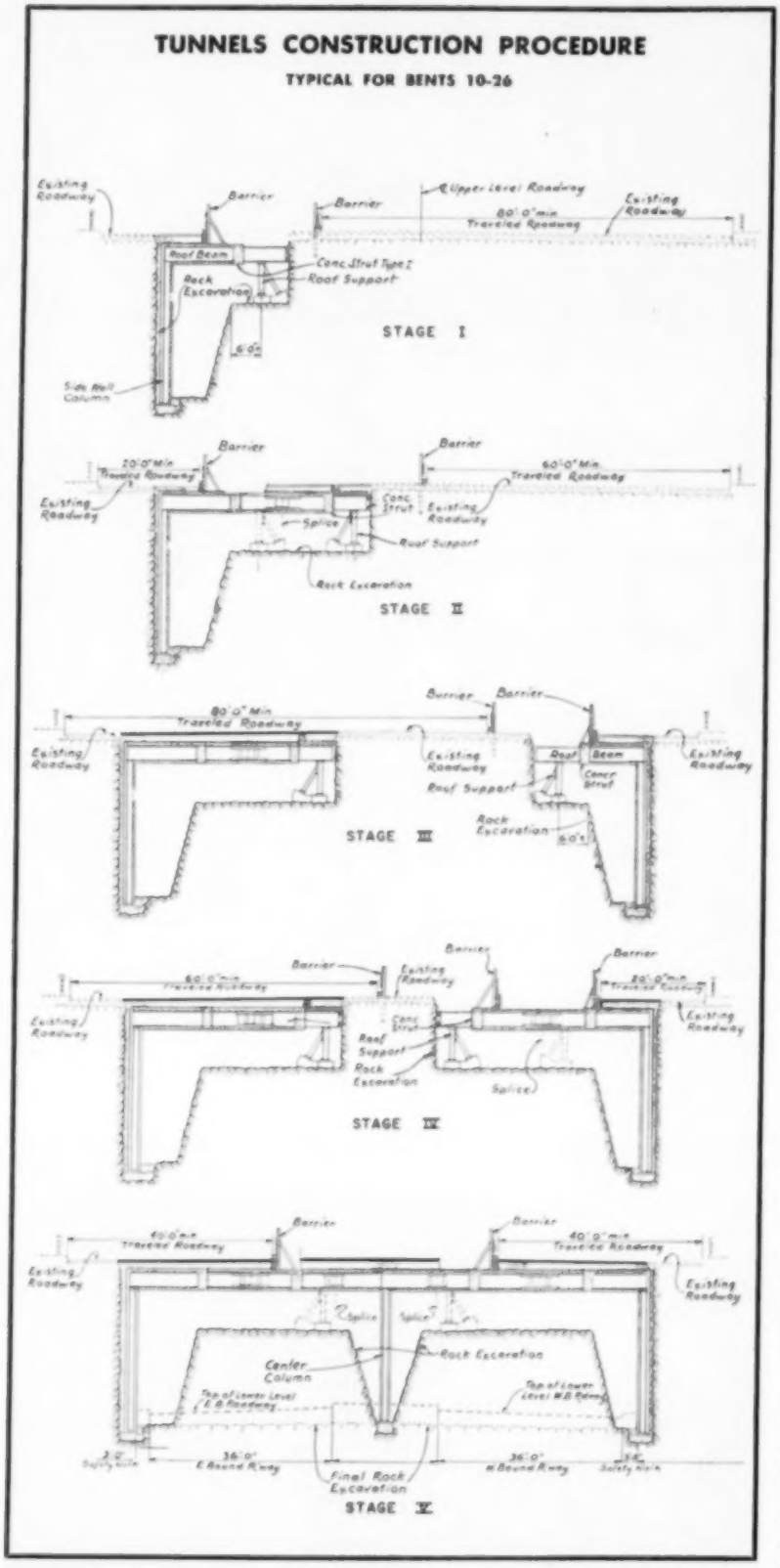
Special precautions are being used to protect the four giant 36-in. diameter suspension cables which are anchored deeply in solid rock beyond the bridge abutment. The cables are completely enclosed by a curtain shield of heavy 3¼-in. planking.

Traprock excavated by Brewster undergoes primary-stage crushing on the site and is then hauled to a stockpile at Englewood to await further use. Later, the stockpiled rock will be put through a secondary crusher that will reduce the material to a size suitable for use in concrete; as backfill for walls and drainage; and as crushed stone subbase for paving.

Heavy excavation equipment on the job includes two Bucyrus-Erie 54-B shovels with 2½-yd. Amsco dippers; a Manitowoc 3600 Speed-

Here is an example of underpinning a structure which must be kept open for traffic. Steel beams are placed on temporary concrete footings to support this overpass, so that the original foundation can be removed and a new one installed at a lower grade.

(Below) Primary-crushed traprock is chuted into a 12-yd. Autocar 10-wheeler truck for haul to the stockpile at Englewood. Material will later undergo secondary crushing.



Stages in tunnel construction are shown. While new foundations are being installed under existing top-deck roadway, an 80-ft. minimum travel width must be maintained.

crane with 70-ft. boom and 2½-yd. Owen clam bucket; and a 2-yd. Lorain 820 hoe.

Three 7-yd. Koehring Dumptors are used to haul rock from the shovels in the tunnel cuts where working space is extremely limited. The rubber-tired units, which require no turn-around, are well-suited to the restriction of the job, according to Kennedy. The haul to the crusher is short, usually within several hundred feet. The Dumptors empty into the 48 x 60 Kennedy primary crusher which is set for a 6-in. opening. The crusher has a capacity of 350 tons per hour, but usually it works only 70% of the time. The haul to the stockpile in Englewood is made by a fleet of 10-wheeler trucks. J. & B. Sisco Trucking Co., Ringoes, N. J., uses up to 10 Macks for this purpose.

Concrete Plant

Some 36,000 cubic yards of concrete for the conduits and other structures are being supplied entirely by a central mix batching plant on wheels. The Noble-Mobile plant produces up to 125 cubic yards per hour of specification concrete. The plant stores 100 tons of aggregate in three compartments, and 275 barrels of cement in another separate compartment. An additional supply of 300 barrels of cement is in a ground silo. A 5-cu. yd. dry batch holding hopper at the end of the batch transfer conveyor charges a tilting mixer.

Structural work on the Brewster contract has been subbed to Willis, Paul & Proctor Inc., Branchville, N. J., engineers and contractors.

Brewster officials on the job include Donald Totten, general superintendent; Edward Kennedy, assistant super; Herbert Frazer, excavation foreman; and Whitfield Johnson, blasting foreman.

George M. Brewster & Son is headed by William J. Brewster, president. Project manager for the job is Happy Hoy. Hoy also serves as project manager for several other Brewster projects in New Jersey.

Representing the Port Authority is F. H. (Dutch) Wernecke, resident engineer for the New Jersey side of the project. Wernecke assists Harry Druding, senior resident engineer.

Recently, Brewster also was awarded a new $3,883,843 contract which will carry its work beyond the original limits of the project at Hoyt Avenue westward as far as Lemoine Avenue.

When heavy rains and snow caused 20,000 yards of rock to slide down a steep canyon wall and block a heavily-traveled stretch of U.S. 50, Pioneer Construction Co. pulled its 71-B shovel off its nearby road construction job and quickly cleaned it off.

New Gateway to Royal Gorge

by Ray Day

Colorado contractor adopts big-shovel technique to dig red granite highway cuts.

ROADBUILDING moves fast these days, even in rock.

Case in point: five miles of new multiple-lane construction on U. S. 50, at Royal Gorge Park entrance, just west of Canon City, Colo.

The job was a brand-new section of modern highway gouged through red granite foothills, beefed up with base and sub-base, and covered with 3 inches of hot mix paving 36 feet wide. What might have been a long-drawn-out job, lasting perhaps a year or more, was shortened to six months time by Pioneer Construction Co., of Pueblo.

The $498,380 contract included all grading, base preparation, asphalt surfacing, and such related work as drainage, guard-rail, fencing and miscellaneous items. About 186,000 cubic yards of roadway excavation were involved, of which 40% was fairly solid red granite. This required drilling and shooting. The remainder, unclassified, responded to ripping and tractor equipment. The job was mechanized to a high degree. Plenty of equipment was sent to the site. One of the contractor partners, Kendall LaCasse, took over field management.

From the standpoint of roadbuilding problems and their solutions, several features are interesting. The rock was tough, seamed and fissured. That created a bad drilling problem. Most of the dirt work was under way when about 4,000 cars a day had to move through the job. The nearby 1,053-ft. deep Royal Gorge, the suspension bridge, and the Denver & Rio Grande railroad tracks far below are a world-famous attraction. Tourist traffic added to the normal load carried east and westbound on the transcontinental route.

From a contractor's standpoint, however, one thing stood out even more prominently. It was the introduction of what to date is believed to be the biggest power shovel application on Colorado highway work. On this job, Pioneer stretched out beyond customary 1½ and 2½-yd. machines, and bought a new 3-yd. excavator. The machine was a Bucyrus-Erie

This rock slide would have been an impossible loading job for a highway shovel of 1½-yd. capacity, without extensive drilling and shooting. For the dipper of this 3-yd. shovel, however, only a couple of jackhammers were needed on out-size boulders.

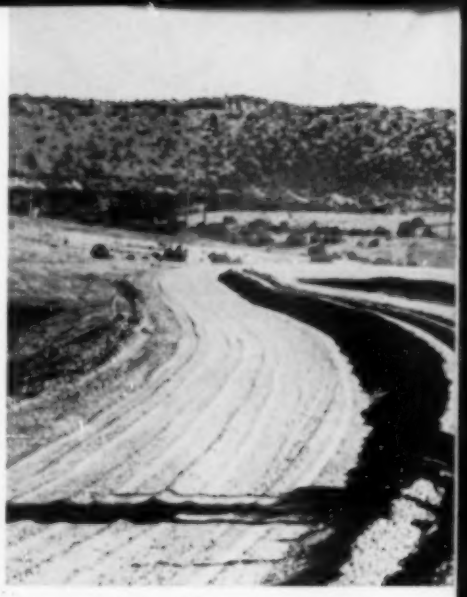
71-B with General Motors diesel power.

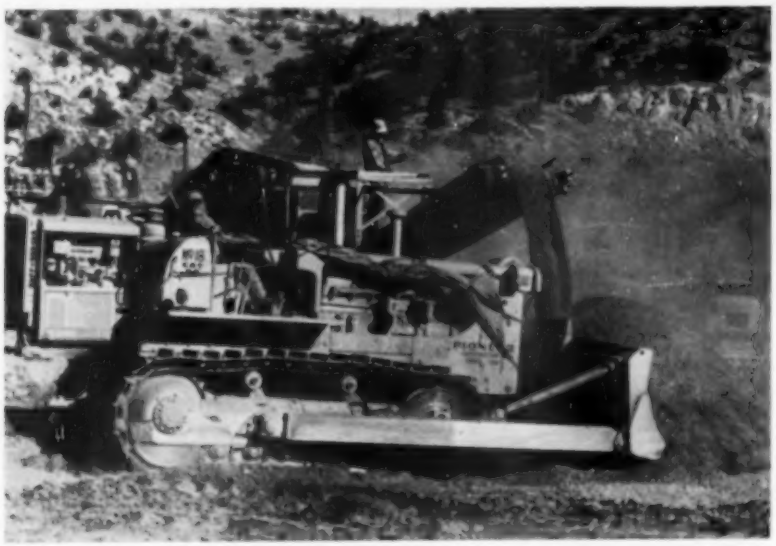
Selection of the large shovel was made with a view toward solving several practical job problems. For one thing, it wouldn't be necessary, with the 3-yd. dipper, to drill the rock on customarily close centers, or use so much powder as would be the case with a smaller-dipper shovel. Output per shift would be higher than a smaller shovel; yet the big machine required only one operator and one oiler, the same as a smaller machine. With a big dipper, bigger hauling trucks could be used to good advantage. The bigger machine would dig efficiently against a higher bank, and tend to boost production generally.

For these reasons, the installation was of interest not only to Pioneer's three partners: Clarence Brown, Joe Mansfield and LaCasse, but to other contractors and to engineers and designers of the Colorado state highway department. They were interested in knowing how the 3-yd. machine would perform.

Emergency Arises

It seemed almost as if the fates intervened to demonstrate. During the regular grading operation, the 71-B handled the heaviest hard-rock cut without difficulty. Then, just as it finished the routine grading, the first heavy rain and snow hit the area, causing a minor catastrophe in the form of about 20,000 cubic yards of rock slide. It sloughed in from a high canyon wall 7 miles west of the job. According to Colorado highway engineers, they were in a tight spot. The slide was on one of the state's main highways, and it had to be cleared quickly. State maintenance crews have no shovels bigger than 1½ yards, and they weren't as close as the 71-B. The rock had come down in such big chunks that it would have been necessary first to jackhammer and shoot about 65% of what had come down, if a small shovel had been used. Removal of the material would then have been slow, costly.





(Above) As aggregates spill off the crushing plant conveyor belt, a Cat D8 dozer pushes the material ahead toward the Pioneer hot-mix plant. (Below) The ¼-in. minus stone is heaped over the feeder trap from which a conveyor lifts it up to the plant dryer.

The engineers did what was obvious. They rented the 71-B and three supporting Euclid end-dump trucks from Pioneer, together with operators. In the process of loading out the big slide, the 71-B actually picked up and loaded some rock so big that the hoists on the Eucs were hard pressed to dump such heavy loads.

Despite the toughness of the drilling, it was handled adequately by three Ingersoll-Rand machines, consisting of Crawl-IR mountings, I-R Hydrabooms and pneumatic drill guns. Carset tungsten-carbide drill bits up to 3½ inches in diameter were used on these machines, with power furnished by several Ingersoll-Rand 600-cfm Gyroflo compressors and one truck-mounted 315-cfm Gyroflo.

The hole pattern varied, depending on the hardness of the rock and the

Between the earth subgrade and finished asphalt pavement, there is a layer of gravel sub-base. Two Cat motor graders blade mix material, getting it ready for compaction.

amount of built-in breakage in cracks and fissures. But it averaged about 7 feet on centers, both ways, with the grid covering cut areas full depth. On slope lines, the holes were carried down to grade, or a few inches below, and delay caps were used to explode the shots. That protected the slope lines and gave a piling effect which increased the shovel banks. DuPont Gelex 50% powder was used for rock shooting, and it did a good job with a blasting ratio of between ¾ and 1 pound per cubic yard.

Every effort was made to drill with sharp bits, so that maximum footage per shift could be realized for each drill. That meant sharpening the bits just as soon as their edges and gage had worn off enough to interfere with their cutting ability. Bits whose gage had been narrowed down were retained for use near the bottom of holes.

Serving the loading shovel were three new Euclid 92-FD end dumps, rated at 15 cubic yards capacity. Four swings were sufficient to fill the truck bodies. The broken rock was used for making the bottom part of high fills. Balance points were so arranged that rock fills usually lay alongside the big shovel cuts.

Scraper Show

In the remaining unclassified excavation, about 60% was handled by fast rubber-tire tractor equipment. Three Euclid S-18's, powered by GM diesels, were brought in. Three Cat D8 dozers were assigned to miscellaneous use around the cuts, and on floors at the shovel. A D9 was put to work doing pusher service behind the S-18's. Some heavy-duty ripping also was done by a Caterpillar double-shank ripper, mounted behind one of the D8's.

Unclassified material—rock particles, gravel, sand and dirt—boiled up into the S-18's as the D9 shoved the cutting blade through the material. Unclassified material was worked into the fills by dumping in 6 to 8-in. lifts, adding compaction moisture from water trucks, and then tamping the lifts with a Buffalo-Springfield Kompactor and a self-propelled Bros SP-30 pneumatic. Despite the difficulty of conducting the dense traffic through the job, the grade was finished in less than 4½ months.

Supporting work, which topped out the finished subgrade, also moved along nicely. One pit location, slightly off the west end of the job with about a mile of dead haul, produced the entire 100,000 tons of crushed gravel and plantmix aggregate. The site was an alluvial deposit in the bottom of a stream bed, forming one of the many watersheds on the east slope of the Rockies which feed the Arkansas River.

Raw pit-run material was dug by a 38-B dragline, swinging a 2-yd. Hendrix bucket from a high bank near the plant. If necessary, extra material was shoved in to the dragline by a Cat D8 dozer. The dragline hoisted the pit-run gravel directly to a grizzly-covered Cedarapids trap, whose apron feeder then sent it on to the rest of the plant.

The plant consisted, in line, of a 2236 Cedarapids primary, and a 2540

Truck-mounted Caterpillar power plant made an easy hookup to Cedarapids portable crushing-screening unit providing sub-base rock.

Hot-mix asphalt paving materials dump out of the pugmill end of the Pioneer 102 Continuflo plant, ready to be hauled out to the roadway. Plant has 200-tph capacity.

A GMC truck dumps its 15-ton load of hot-mix as a Barber-Greene finisher lays the pavement. Surface is 3 inches deep and 36 feet wide, standard in mountain-country.

Cedarapids primary crusher, both driven by Caterpillar D339 engines. Secondary crushing was handled by a Cedarapids Super Commander, driven by a Cat D353. Final reduction was made by a Cedarapids 2240 roll, turned by a Cat D337 engine. The plant setup was flexible, so that 2½-in. minus sub-base rock and ¾-in. minus plantmix aggregate could be made simultaneously, if desirable. In general, however, the setup was held on the production of one grade of material until that tonnage was completed; then the screens were changed to turn out the next size.

Crushed rock was hauled out to the highway by a fleet of rented Ford, Chevrolet and GMC trucks, which spread the gravel in a well-proportioned windrow. It was then blade-mixed by a Cat No. 14 and a No. 12 motor grader; necessary compaction moisture was added meanwhile. Final rolling of this rocky base was done by the Bros 30-ton machine.

Asphalt was made by one of the company's newest machines—a Pioneer 102 Continuflo hot plant. The machine combines a No. 99 drier-dust collector unit, and a No. 382 pugmill and screening plant. It was capable of turning out 200 tph under sustained conditions. The plant was served by auxiliary storage tanks, automatic hot oil heater and fuel tank storage for the dryer burner.

The finished asphalt surface was laid by two Cedarapids pavers, and final rolling was done up close to these machines by two Buffalo-Springfield 8-10 ton steel wheel rollers.

Since all field offices, parts warehouses, material storage and other such space was trailer mounted, it was easy to pick up everything when the job was finished, and move back to headquarters at Pueblo, or to other jobs under construction. Practically everything used on this job was fully portable, with the exception of the big shovel. Hot-plant components, rock crusher units and the like were all mounted on their own rubber-tire wheels, so they could be moved swiftly. It was such efficiency and mobility, coupled with high production during working hours, which made the job move rapidly.

Buffalo-Springfield steel-wheel roller works behind the paving spread as it compacts freshly laid asphalt pavement.

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Bucyrus-Erie is *very* interested in the detailed production records you maintain on the machines in your pits. The reason: Bucyrus-Erie wants to be sure that the parts you buy for your equipment are *more than satisfactory*.

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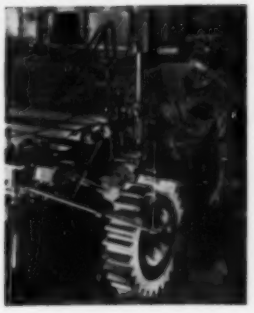

How BRAWN-BACKED Payscraper® features give you stepped up...loading

From power plant to push-block, the 34-cu. yd. International 295 Payscraper gives you an exclusive combination of features that step up dirt-on-fill delivery! Compare quiet, big-capacity DT-817 Payscraper power. Try the advantage of up or down, on-the-go, Payscraper power-shifting that provides load-speeding *automatic* direct-drive lock-ups in second, third, and fourth gears! Measure *extra value features* like safe, effortless power-steering—that leaves "the steering feel in the steering wheel." Note how exclusive torque-cushioning planetary drive axles add dependability to rough-and-tumble earthmoving! See how 122-inch bowl width speeds loading and unloading—adds control ease and stability, loaded or empty. Prove on your job that bonus performance "rides" the Payscraper bowl. Choose the 2-axle "295"; or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration.

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Payscraper power-to-payload punch tops all other rubber-tired rigs—because the fast-slugging, high-torque International DT-817 diesel is the Payscraper power plant! The 375-hp, turbocharged DT-817 gives you direct, push-button starting; all-altitude high-efficiency performance; power for top rim-pull to help speed all steps of the cycle; time-saving "no-lag" control power!

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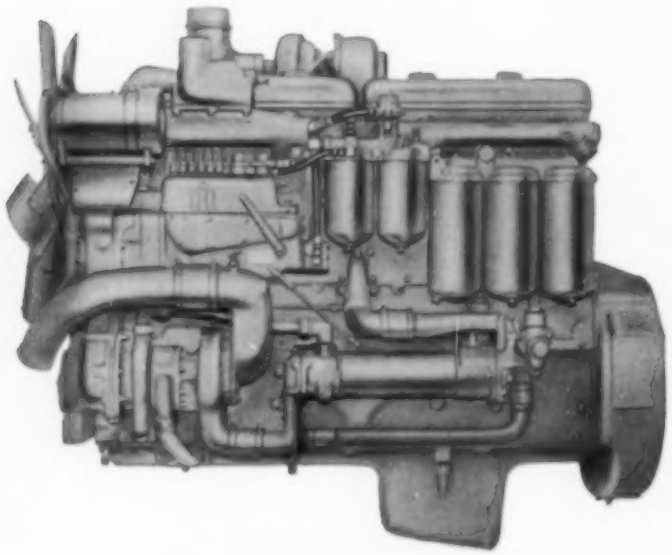

Even "dead" sand comes alive and "boils" fast into the Payscraper bowl. Every detail of Payscraper design aims at speeding the cycle, and *staying available!* The 21-inch diameter steel cross tube provides super load-bearing strength and resistance to impact. Bowl "backbone," draft arms and side reinforcing members all are massive high-strength box-section steel weldments. "X"-member reinforcing maintains perfect push-frame alignment at all times. And the 4-speed, planetary-type, torque-converter power-shift transmission automatically adjusts torque and load to speed — to maintain full capacity!

You steer the 140,000-lb. loaded Payscraper almost as easily as a 3,600-lb. automobile! Payscraper gives the big control advantages of (1) exclusive International rack-and-pinion plus tandem pump steering system; and (2) 3-degree forward spindle pitch that improves scraper balance and prevents "nose downs" in high-speed turns. The 16-adjustment, bump-smothering seat builds operator confidence, too. And reach-easy power brakes, "control tower" vision, and flush deck safety help him deliver full Payscraper capacity, and take advantage of speeds up to 33.5 mph. He commands ample power and traction to pull directly out of 90-degree turns, even on soft fills!

The fast, positive-acting Payscraper ejector mechanism is powered by the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control spreading action. Apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. Action of six heavy-duty springs, stretched during ejection, positively powers the ejection mechanism's return!

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(Left) Hydraulic backhoe on Case 420 utility tractor cuts through tangled mass of roots of a date palm clump. Trees must be split apart before being transplanted. (Right) Homelite chain saw gets into spaces where even an axe man couldn't reach.

Jungle Busters Shape Island Paradise

Small task force of high-output machines clears the way for a luxury-type community on a jungle-like island just 15 minutes' drive from Miami, Fla.

LUSH tropical growth on an island tract just outside Florida's biggest city is being pushed back—and transplated—by contractors using a select group of machines. This ground work will pave the way for a half-billion dollar dream community of plush homes and fancy hotels.

Run your finger over the map of any big city and you'll spot places that weren't there a couple of years ago. Take a ride out in the country and you'll see where whole new townsites made vast changes in the landscape. But never anything quite like what is happening on an old coconut plantation in south Florida.

For here—on an island within sight of Miami—bulldozers and machete-wielding laborers hack out tangled jungle growth so thick that it stymies grading work. Buzzing chainsaws slice through matted clumps of date palms. Engineers sight their "guns" and pound in stakes. Something big is happening. A mechanized task force has scratched out the start of a half-billion dollar dream community.

But this project defies all yardsticks of equipment use. Here is what the contractors set out to do:

1) Dig three miles of broad canals using only one dragline.
2) Move almost a half-million yards of dirt with a "fleet" of two scrapers and two dozers.

Bird's-eye view shows the entire length of Key Biscayne, connected with Miami by causeway. New development will occupy the 547-acre area at the south end of the island.

3) Build eight miles of sea wall using a truck crane and a few rolls of plastic sheeting.
4) Transplant a forest of mature trees with a small utility tractor and a truck-mounted A-frame.

Actually, no part of this work plan would be possible without the kind of rigs which dirtmoving specialist Jack Cook calls "real breadwinners." Cook is superintendent for Troup Brothers, earthmoving subcontractor. His meager fleet is expected to shape this wide sand spit into a tropical paradise of wide streets, sparkling canals and tree-shaded lots.

This is Cape Florida—one of the most exclusive developments in the Sunshine State and, paradoxically, one of the most widely known. Millions of nighttime TV viewers know Cape Florida as the place where NBC's Jack Paar bought a lot. They joined him in a filmed visit to the nicely graded, palm-shaded property.

The viewers missed the real show, though. They should have been there a couple of years ago, when Jack Paar's lot—and the rest of the 547-acre tract—looked like a steaming rain forest. (The place is so strong a look-alike, in fact, that several war movies have been shot in its jungles.)

Here was a parcel with everything a land developer could ask for—lush natural growth; sheltered bay frontage on one side, white sandy ocean beach on the other; and plenty of room in between for winding streets and waterways. Then add this big plus—the property is just 15 minutes drive from downtown Miami.

Secluded Area

How had this close-in paradise escaped the onrush of civilization? Well, after the coconut plantation went out of business, the area became a private retreat for a succession of millionaires. Aside from a few conveniences added by the sportsmen owners (like a yacht basin, sea wall and some lowland fill), the area was little changed from the day some 70 years ago when the coconut planters pulled out.

The palms that survived the coconut fiasco became the focal point of Cape Florida's new look. Desser and Garfield, Inc., the developers, carefully platted streets, waterways and lot lines so many of the giant trees could be left standing.

But even when a palm has to go, the landscape crew rarely uses an axe. For while it's true that only God can make a tree, Desser and Garfield's men have sure learned how to move them. Before the job is done, about 5,000 palm trees are tagged for new spots. For most of them it is a two-hop trip. The crew moves the trees first to a 10-acre nursery, then later to a graded lot or roadside spot.

Herb Whitehead, foreman of the landscape crew, thinks nothing now of moving palms with 45 feet of wood (the fronds often reach 15 feet above that). Key to the job is speed. The longer the tree is out of the ground, the less chance it has to survive the move.

Biggest headache to the moving men are the matted clumps of trees that grow wild on the land. Too unwieldy to move as a unit, the clumps must first be split apart. The crew makes the job look easy. Actually, it is a tricky business. The roots are thick and sinewy. There's barely room enough for a man to squeeze between the tree trunks in the clumps.

Whitehead tackles the job with a fast stepping task force—three men and a Case 420 utility tractor. The driver spots the tractor alongside a clump of trees and hops around into the rumble seat. A touch of the hydraulic controls plants the outriggers

Cape Florida Light

-- Symbol of Progress

UNTIL this year few tourists got to see Cape Florida lighthouse close up. Not unless they were lucky enough to be on a boat, that is. For the slender brick tower that sits at the very tip of the island was a

rough 1½-mile trip from the fence that guarded the property.

Now the century-old lighthouse has ended its period of isolation. The developers adopted the light as the hallmark of their new community—and have torn down the fence so tourist and homeseeker alike can drive on hard-surfaced roads right to the base of the tower. Thus the light emerges as a symbol of progress. The kind you create with draglines, bulldozers and ready-mix trucks.

And when the machines move out, and the sweatshirt-clad workers draw their final pay, the Cape Florida light will be the only old landmark still in view. Added to the landscape will be 600 plush homes (what other kind of home would you build on a lot that costs up to $50,000?). Skyscraping hotels and apartments will grace the ocean and bay fronts. And while space has been set aside for niceties (such as a yacht club and cabana colony), necessities are there too. Shops and offices will occupy a zoned area on one of the main avenues.

Development Plans

Here is the breakdown of space on Cape Florida according to use.

Single-family residence	286 acres
Apartments	30 acres
Ocean and bayfront hotels	189 acres
Commercial	38 acres

The developers plan to put in 13 miles of streets. All utilities will be placed underground (which stands to cost almost $3,000 a lot, but will add untold value in better appearance and trouble-free service).

Pulling out a bucketful of sand, dragline shapes a canal in the cleared section of the tract. Rig swings a 1½-yd. Hendrix bucket on its 60-ft. boom, and takes out a 14-ft. cut.

firmly in the sand. Then the operator swings the hand levers to guide the backhoe bucket in a sweeping arc. The bucket teeth bite through the ground, coming up with a mouthful of sand and roots.

In minutes the rig cuts a neat trench to tap-root depth along the sides of the clump.

When the ring trench is finished, the job of cutting the clump apart begins.

A laborer squeezes in between the trees with a Homelite gasoline-powered chain saw held in front of him. He plays the throttle—more speed for good bite in the roots; ease up when the chain spits a stream of sand. In minutes, he slices a neat cut right down the middle of the clump.

Then the men wrap a length of chain around one of the trees, hitch the other end to the tractor. The operator inches the rig forward till full strain is on the chain. Then he guns the engine. The chain bites into the bark of the tree. Finally, the trunk sways and tilts. The tractor eases forward, widening the split in the base of the clump. The men saw off the exposed cross roots, and the tree is ready to go. Total time for the job: about one hour.

An old Army 4x4 truck fitted with a simple A-frame picks up the tree, roots and all, and hauls the unwieldy load to the nursery. There, each tree is planted in a deep hole and braced with timbers to keep it upright.

Dirt volume on the job is pretty well balanced. Spoil from canal excavation cuts goes into low spots on the grounds and as backfill behind the bulkheads. Troup Brothers, the Miami dirtmovers, try to make it a straight-line deal. Scrapers cart away the stockpiled fill almost as fast as a dragline dredges it up.

A Bucyrus-Erie 38-B goes it along the canal excavation. This is tight tolerance digging that keeps the operator on his toes. Cuts must be right on the money to follow the rigid site plan, and to avoid extra backfill work.

Survey crews stake out the channels. Average cut is 100 feet wide and 14 feet deep (which allows 9-ft. draft for your yacht at low tide). The 38-B wields a 60-ft. boom so that it has plenty of reach to dig the channel in two passes, one along each side of the canal.

The dragline runs a normal digging cycle, with one slight change. Instead of building a long, low windrow on the canal bank, the rig loads the spoil onto high stockpiles. This sets the dirt up for easy downhill scraper loading, or rehandling by dragline if desirable.

The canal here cuts through an area that was raised to grade years ago with hydraulic fill. Digging is easy. The dragline averages over 3,000 yards per day—about 120 feet of completed canal.

Two Caterpillar DW21-No. 470 scrapers haul the material from stockpile to fill area. A Cat D8 dozer sets the stage for the highball loading schedule. The rig smooths a ramp up one end of the stockpile, then clears a wide swath on the downslope.

The pans take the hill cautiously, because the loosely piled sand offers poor footing for high-speed travel. On the loading run, however, the tempo picks up. With the help of gravity, and the D8 behind as a pusher, the scraper picks up a heaping 20-yd. load in just over 30 seconds. Downhill loading is the big factor in trimming this time so close.

The pans take off over the sandy wastes as though they were riding superhighways. In fill areas, they

Stockpiled sand is loaded out by Cat DW21-No. 470 scraper combination. The Cat D8 doubles as a pusher and clean-up dozer. In the background is jungle still to be cleared.

Job-site casting yard makes piles and panels for the canal bulkhead within easy reach of where they will be used. Concrete is delivered in Rocket agitator on a Ford chassis.

Completed bulkhead neatly lines a canal. All the concrete piles and panels are precast; only the cap beam is cast in place.

spread the sand in smooth layers that need little touch-up grading. At canal-side, they put down a thick windrow. Then a D8 dozes the fill behind the completed sections of seawall.

All parts of the precast concrete seawall are made on-site—in fact, within crane's reach of where they'll be used. Doran Seawall Co., subcontractor on this phase of the job, sets up its casting yard on any clear spot along the canal bank.

This "Erector-set" type of sea wall is a Florida brainchild. The design produces a high-strength attractive bulkhead at very low cost. Basically it is a tongue-and-groove arrangement of piles and panels. First you build a picket fence of T-shaped piles; the panels then key securely in place behind the lips of the pile flanges.

The men set up for a pour in less than half a shift. They spread a thin sheet of polyethylene film on the sand, then hammer together the perimeter forms. In a typical set-up, they pour nine panels and ten piles (enough for 72 linear feet of bulkhead). The panels measure in at 7-ft. 7-in. width; 9-ft. 9-in. length; and 6-in. thickness.

Model shows planned development at Cape Florida. Hotels and apartments line ocean and bayfront areas, and homes dot wide streets and canals. Lots will cost up to $50,000.

The men drop in a sheet of road mesh for bottom reinforcing, then stand a tied mat of No. 4 and No. 5 bars on chairs improvised from pieces of rock. The piles are 14 feet long, and measure 18 inches wide across the top of the T.

When the piles have cured (about three days after they are poured), an Insley ½-yd. truck crane with a drop weight drives them like a line of soldier beams. A simple timber template, marked for proper spacing, makes the pile setting chore a snap.

Install Tie Bars

A sturdy tie-back system braces and aligns the bulkhead. It consists of a 12-in. diameter timber pile driven 20 feet inland from each of the bulkhead piles. A No. 8 tie bar, slipped through holes in both piles, locks in place with a washer and nut at each end.

When the T-piles are set and aligned, the crane picks up a panel by means of lifting loops cast in the upper edge. As the rig swings the slab over the two end-piles, the men grab the corners. They guide the panel behind the pile flanges, then steady it as the crane lowers away. It takes a little up and down jiggling, but the panel soon lands right on grade.

The wall-building crew has no trouble keeping pace with the dragline. They are geared to set 100 linear feet of bulkhead a day, and have bettered that mark quite regularly.

Desser and Garfield, Inc., Cape Carol, Fla., controls all work on the Cape Florida project. Arthur A. Desser, president of the firm's parent body, Lefcourt Realty of New York City, is in over-all command. Construction at the site is in direct charge of Norman A. Cortese, vice president and head of land development.

Jack Cook is superintendent on the job for Troup Brothers, earthmoving subcontractor. Doran Seawall Co. foreman is Cliff Wilson.

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Check these Skooper Features

- 7-FOOT LEVEL CROWD
- REVOLVES A FULL 360° FOR EASY LOADING
- DISCHARGE HEIGHT OVER 10'
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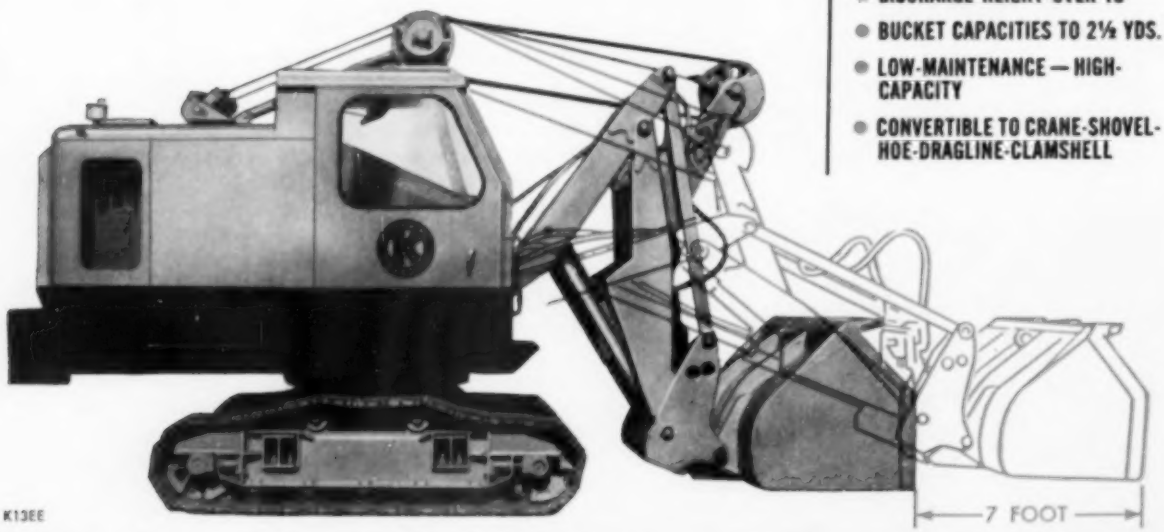

K13EE

Our Production 52%"

A report on the Koehring Skooper

by W. C. Ratliff

General Superintendent
Sunniland Lime Rock Company
Sunniland, Florida

"I'D have bet a hundred dollars the Skooper couldn't do a job for us before seeing it in action. It has, though, and enabled us to increase production from 230 to 350 tons per hour — an increase of 52%.

We use the Skooper to load lime rock. We excavate this material below water, stock pile it for a month to get the water out, and then run it to a crusher. While drying, the rock has a tendency to set up, and becomes extremely hard to dig. This is where our Skooper has paid off."

Skooper keeps four trucks busy, cuts maintenance

"Before Skooper, we tried crawler-mounted end loaders, but maintenance was too high. We tried rubber-tired loaders, but they just couldn't dig the rock effectively. We then went to a 1-yd. dragline, but it was too cumbersome and slow — couldn't keep three trucks moving. With Skooper's 7' level crowd and full-revolving swing, loading exceeds 350 tph. We now keep four trucks busy at all times and have time to use the Skooper to keep the haul road clean besides. Average loading time for a 7½ yd. dump truck is 55 seconds."

Digs – Swings – Loads from a Standstill Position

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Milwaukee 16, Wisconsin

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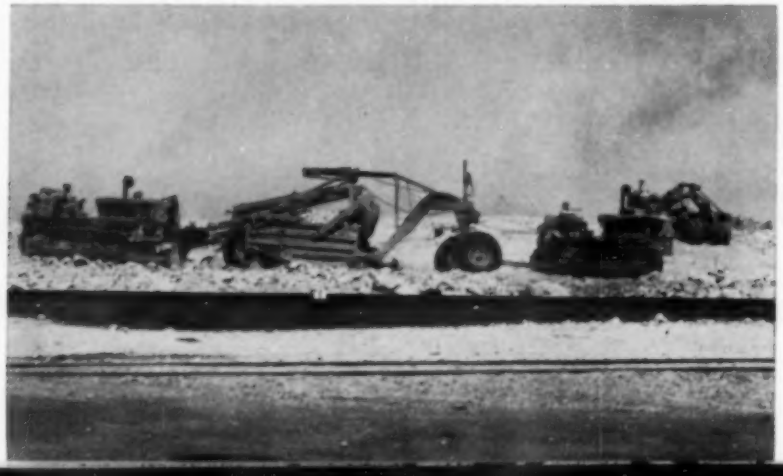
Test site is being built into side of a ridge which lends itself to construction of the rocket stand. Hard rocky cut is shown here.

Rippers Help 'Rocket' Schedule

In month's time, contractor cuts down large knob of granite at rocket testing site.

by Floyd Suter Bixby

(Above) Dozer carrying ripper shank equipped with Double J breaker plate digs into half-decomposed granite. (Below) Following ripping, Carryall scrapers pick up the rock.



AT Edwards air force base in southern California, a new research center is being completed, whose construction is a tribute to modern ripping methods in moving rocky excavation. By calling on the latest type heavy-duty ripping tools, a contractor was able to meet a very tight time schedule, thus helping to prepare the rocket-testing site for subsequent equipment installations.

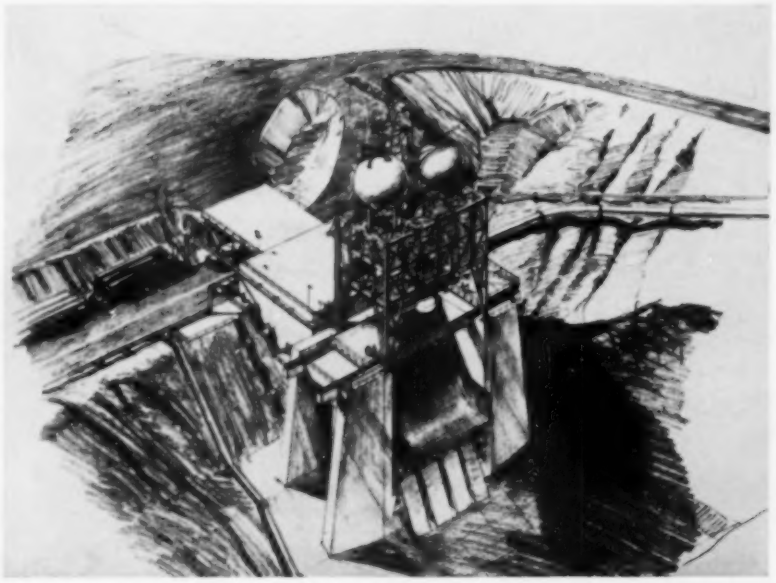
F. W. Case Corp., Newhall, Calif., was the contractor. The Rocketdyne division of North American Aviation, Inc., was the agency for whom the work was done. The Edwards air base was selected for the test site, chiefly because of its remote location, which minimizes the noise problem. The ridge on which the installation was built also lent itself to the construction of a rocket-testing stand.

F. W. Case, head of the contracting outfit, explained the spot his firm was in. "We had 65,000 cubic yards to move to level a hard-granite knob to make room for the test facility," he said. "We had a tight completion schedule calling for all that material to be moved in 30 days. But we figured that modern ripping machinery would handle most of the material,

and like several other contractors who bid the job, we planned to use that method. However, we did have about $20,000 set up in our estimates for drilling and shooting.

"We moved in with two D8's and Carryalls and three D8 dozers. They had worked only a few shifts when they struck material too tough for them to handle. We then brought in a pull-type ripper, and in an effort to break up the half-decomposed granite, we loaded it down with four tons of extra weight. The ripper point got down all right, but the rock was so hard and abrasive that we were burning up ripper points at a staggering rate. Sometimes a ripper boot would burn up completely in 20 minutes.

"We could have moved in more machinery, of course, but that would simply have raised our costs. About the time we were most seriously concerned, I was thumbing through the pages of one of the construction trade magazines one day. I noticed where a new and improved ripper had kept another contractor in another part of the country out of a similar tight spot. This ripper, which is called the Double J Breaker, is manufactured right here in southern California at Bell. I gave them a call on the telephone and they weren't long in delivering a shank and breaker plate, especially designed and manufactured for the Cat D8 tractor we were using."



Artist's rendering shows how the 1.5-million-lb. test stand will look. 12,000 cubic yards of foundation concrete will help hold F-1 NASA engine down during static power tests.

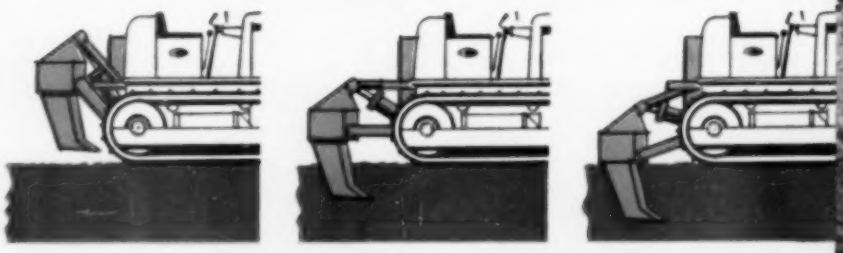
Breaks Rock

Installation of the big ripper gave the D8 a new surge of power. Because of the peculiar cutting action of the tapered, triangular breaker plate which is mounted at the heel of a straight, slim shank, the rock was broken up much better than anything had been able to do before. Although the new ripper had its share of troubles in the harder material, too—lugging down the tractor and groaning to get through—it was possible in less than a shift to discontinue the use of the pull-type ripper. The single unit on the D8 was keeping both earthmoving scrapers busy. Production picked up right away to a level sufficient to meet a 2,000 yards per day schedule necessary to put the job out on time.

When the job was finally completed within the estimated time limits, the Case organization had ample proof that its selection had been wise. For example, the original estimate called for 10,000 pounds of powder to be used in shooting; the actual amount used was 24 boxes, or about 10% of the amount figured. While $20,000 had been set up as the probable cost for drilling, actual cost was $5,000. By turning in that kind of performance, the idea helped Case to complete a job on time, and helped speed North American Aviation's rocket-testing facilities.

(Left) Owner F. W. Case examines the ripper shank and breaker plate, with its protective hardfacing metal. (Right) The rock was so hard it literally made a worn-tooth graveyard. These worn H&L teeth will be hardfaced and put back into service.

The unique parallelogram design of Allis-Chalmers rippers keeps shanks at the most effective angle . . . up . . . halfway down . . . down full depth.



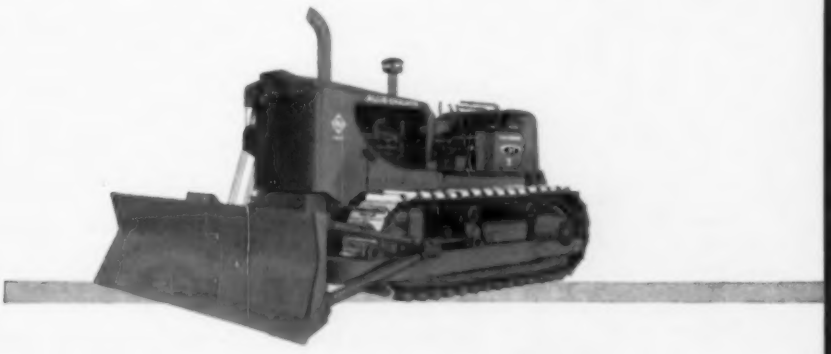
TOUGH TOOLS MATCH TOUGH JOB POWER

Allis-Chalmers rear-mounted rippers maintain most effective penetration angle at all depths . . . up front, specially designed bulldozers make most of HD-21's tremendous power.

Modern tractor power, *plus* modern ripper and dozer design, is making a big difference on today's tough jobs. With the HD-21 and ripper, for instance, up to 60,000 pounds of drawbar pull let you rip 'n' doze what you once shot and shoveled . . . puts one man, one modern machine in place of a typical 4-man blasting operation.

Allis-Chalmers leads the field in making rippers practical and effective for these tough jobs. The introduction of *parallelogram design* — unique Allis-Chalmers feature on these big HD-21 rippers — keeps shanks at most effective penetration angle *at all depths.* You get the *same* effective tooth angle *. . . up . . . halfway down . . . or working a full two feet deep!*

In addition, Allis-Chalmers dozer design utilizes the latest developments in steel to produce durability which makes the most of today's big tractor power without profit-killing maintenance and repair. Trunnions, "C" frames, struts and moldboards match the HD-21's brute strength. If you're bidding or working *any* tough materials, your Allis-Chalmers dealer will furnish all the facts on successful ripper/dozer application. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



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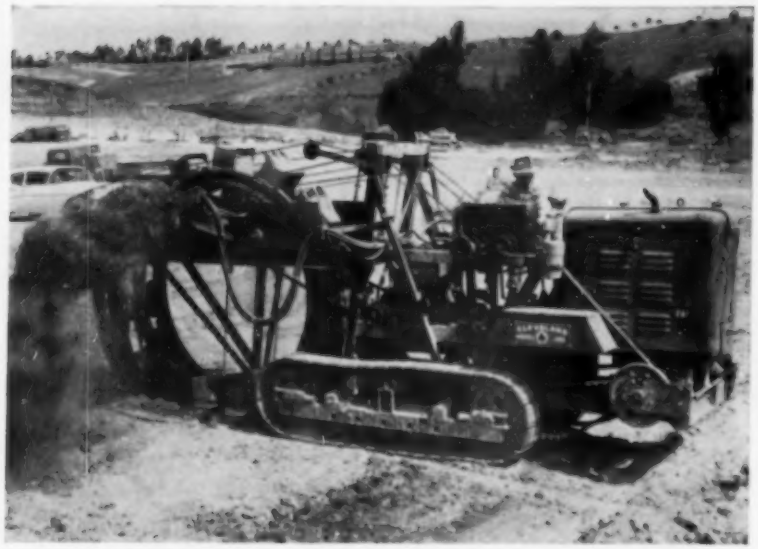

6,000 FEET OF HOUSE FOOTINGS A DAY!

THIS CLEVELAND J TRENCHER is cutting 12-inch wide by 12-inch deep trench for house footings in sand, rock and adobe, averaging 6,000 feet of smooth, clean trench every 8-hour work day. "The Cleveland J-20 digs footings faster than any trencher I've ever used," says contractor Frank Arcerio, president of the Montebello Trenching Co. His J-20 is digging 60,000 feet of trench for a large housing development in Palos Verdes, California.

The Cleveland J-20 is an ideal trencher not only for footings but also for mains and house services for all utilities lines – for all types of city and suburban trenching jobs. Only 60 inches wide and extremely maneuverable, it works easily in tightest quarters, sneaks by obstructions, digs as close as 18 inches to parallel walls and fences. It's easy on lawns, sidewalks and blacktop, too and easy to move from job to job at safe truck speeds.

THE J-20 HAS THE FEATURES THAT MEAN

More Trench... in More Places... at Less Cost

- 100% control at operator location
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- pulley-enclosed dual conveyor drive
- world's finest trencher crawlers
- 1,000-hour track lubrication
- digs 12-24" wide to 5½' deep
- 33 positive digging speeds
- optional hydraulic crumbing shoe

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News from the Field

Chicago to Extend Navy Pier

The city of Chicago's public works department has awarded a $1,875,000 contract to Raymond International Inc., New York, for construction of a 1,250-ft. long extension of Navy Pier facilities in Lake Michigan.

Built entirely of concrete, the new pier will be completely fireproof and virtually maintenance-free. Its 96-ft. wide deck of precast, prestressed concrete planks will support two railroad tracks, and is designed for concentrated loads, in addition to a uniform live load of 600 pounds per square foot.

An unusual feature of the new pier is the use of prestressed concrete cylinder piles to support the deck. These highly prestressed piles can support unusually large loads for their size and weight. Their installation is an economical and relatively simple pile driving operation requiring a large hammer and adequate crane capacity.

Over 300 cylinder piles will be manufactured locally, trucked to the waterfront, then barged to the site, where they will be driven to an elevation approximately 78 feet below lake level. Piles will be about 80 feet long and three feet in diameter. Their 4½-in. thick walls will have eight 12-wire prestressing cables tensioned to 160,000 pounds per square inch. The piles have a maximum design loading of 230 tons. The concrete in the piles will have a minimum strength of 7,000 pounds per square inch.

Six-pile bents spaced 24 feet apart will be capped with formed and poured concrete. Prestressed concrete planks spanning the bents will be four feet wide, and will vary in thickness with a minimum of 7½ inches at mid-span.

The new pier was designed by the bureau of engineering, Chicago department of public works, which is headed by Dick Van Gorp, chief engineer. Arthur Fertell will be project manager for Raymond International.

GM's Eucild Div. Gets New Head

Appointment of V. L. Snow as general manager of Euclid Div., General Motors Corp., Cleveland, Ohio, was announced recently. Snow succeeds R. Q. Armington who has resigned to devote full time to his family manufacturing interests.

V. L. Snow

Snow joined the former Euclid Road Machinery Co. in 1935 as a member of the engineering department, and has held various sales and engineering positions with the company. In 1949, he became domestic sales manager and was director of sales from 1953 until 1958, when he was made director of engineering. In his new position, he will be responsible for the administration of the four Euclid plants in Cleveland, the crawler tractor plant in Hudson, Ohio, and operations of Euclid (Great Britain) Ltd. in Scotland.

Job-Built Mole Bores Sand Tunnel

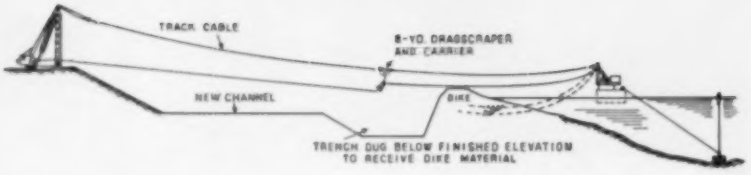
Using its own shop and the ingenious minds of its supervisory mechanics, Fisher Contracting Co. of Phoenix, Ariz., recently saved considerable time and money by creating a machine called "The Mole." Thanks to this powerful, little monster which was built first in model form with a master Erector set, an 84-in. concrete pipe for a storm-sewer job was shoved 88 feet under a railroad track through soft, running sand, without trouble or delay. The job took only eight days.

If conventional methods had been used, it would have taken much longer. A shoofly would have been necessary; rail traffic would have had to operate under slow orders; and the soft, running sand would have had to be open cut, probably by scrapers or dragline. The Mole eliminated all that.

When Jim Lancaster, manager of

Continued on page 51

Eight-Yd. Sauerman DragScraper Cuts Seaway Dike Removal Costs



Atlas Construction Co. Ltd., Montreal, Que., had the job of enlarging the St. Lawrence Seaway channel near Iroquois, Ont. An 8-yd. Sauerman Crescent DragScraper and four-wheeled carrier was used with a crane to remove the perimeter dikes composed of tough digging glacial till and to backfill the trenches.

The hoisting line of the crane, used as a track cable for the Crescent and carrier, ran through a block on the boom tip to a 25-ft. tail tower mounted on a 20 x 40-ft. barge. The structural steel spud mast used to support the boom was pin-connected to facilitate movement of the crane.

After inhauling to the trench, the 8-yd. Crescent was gravity-returned part of the way to the excavation. A single-drum hoist mounted on the barge tail tower controlled the backhaul cable used to complete the return cycle. The job was handled by two operators, one on the crane and the other on the barge. The operating span varied from 600 to 900 ft. Average DragScraper hauls were 300 to 600 ft.

This is a typical example of how a crane can handle a Crescent DragScraper of greater capacity than the original dragline bucket or clamshell. Larger machines can usually double their capacity with a DragScraper. Smaller units can handle about 50% more. Machine range is limited only by the spooling capacity of the hoist drums. It can reach farther, dig deeper under water and take material out of soft areas without the nuisance of mats and the hazard of undermining the crane.

DragScraper traveling down track cable on return to underwater dike. Barge is in background.

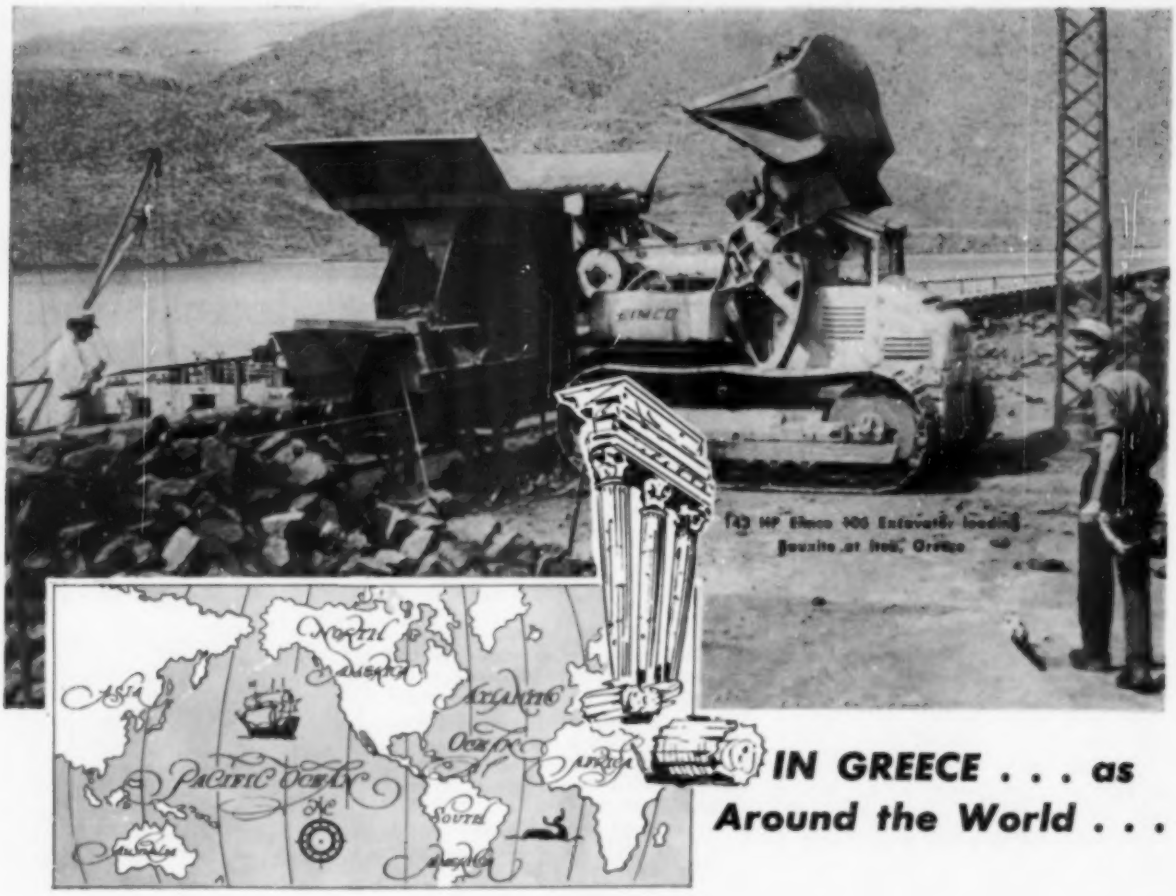
When the boom is supported by a strut, a DragScraper of still greater capacity can be used. The strut increases overturning resistance and allows a greater load to be imposed. Crescents used in conjunction with such supports increase the rated capacity as much as 4 to 1.

Many operators consider the Crescent DragScraper as standard auxiliary equipment. The DragScraper permits bidding on and getting those premium jobs that could not be handled without considerably more time and expense by other means.

Find out how much you can increase your crane's capacity. Write or call giving the make, model number and boom length of your machine. Field Report 228 and Catalog J gives more information on DragScraper operations with cranes.

SAUERMAN BROS., INC. 622 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks



IN GREECE . . . as Around the World . . .

EIMCO CRAWLER-TRACTORS PROVE EFFICIENCY... GREATER WORKABILITY !

Real savings in time and manpower result from the use of this Eimco 105 Excavator, one of three operated at the Parnasse Bauxite Mines in Itea, Greece.

This Eimco Excavator, with its unique overhead loading action, dumps directly into a specially designed hopper, which distributes the load onto a conveyor, running to the ship's hold. Others are used in mining.

With its great breakout force; up to 55,000 pounds drawbar pull with zero track slippage at sea level; easy finger tip controls and rugged, quality construction, the Eimco Excavator can have many applications on a variety of materials handling jobs . . . the tougher, the better! The Excavator bucket transmission is an independent assembly, operating at a constant speed, with high and low speed ranges, through the rear power take-off and belt drive.

Let a qualified Eimco dealer or sales engineer show you how a modern, efficient Eimco crawler-tractor unit can save you real money and time, with the machine that has established a record of 70% less in parts and maintenance costs than any competitive tractor . . . the quality built and engineered Eimco . . . now available in 100 HP, 143 HP and 205 HP Diesel series of Bulldozers, Excavators, Front End Loaders, Fork Lifts and Log Loaders.

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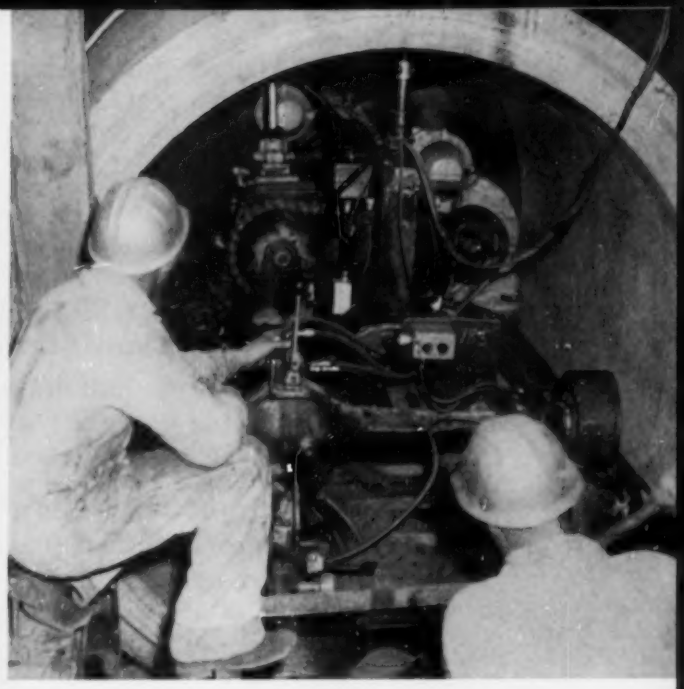

(Left) This view looks down on operation; shows Mole at work inside pipe. Skip carries excavated material. (Right) Closeup of Mole digging shows how jack anchorages were placed; transmission box for conveyor drive; and boring method.

News . . .

Continued from page 49

Fisher's pipe construction department, first conceived the idea of the machine, he walked into Equipment Superintendent Bud Mentzer's office and started to describe what he wanted.

"There's a master Erector set over on the wall," Mentzer said, gesturing toward a set the company had recently purchased. "You'll find wheels, motors, sprockets—just about anything you'll need. Let's build a model, and maybe we can work out a lot of the bugs before we start building the rig."

It worked exactly that way. Building the machine in model form eliminated at least 80% of mechanical faults during the "talking" stage. When the machine was finally built and put to work, it operated almost perfectly.

Basically, the Mole is a small rig, 12 feet in overall length. It sets inside the pipe being installed, and excavates from the tunnel face with a 3-blade auger-type cutter. This cutter operates inside a brow plate, which sets up tight against the face, and holds any material outside the tunnel face from caving in. The machine is prevented from kicking back by Be-Ge hydraulic rams equipped with suction seats which grip tight inside the pipe. This 3-point anchorage is strong enough to eliminate kicking.

Main power comes from a General Electric 15-hp electric motor, which transmits power through a double-reduction gear into a secondary 5-speed transmission. This, in turn, drives the cutter shaft, and also operates a 20-in. discharge conveyor which carries excavated material back from the face to a discharge point in the clear of the pipe. The discharge conveyor can be lengthened in 8-ft. increments as the pipe advances by means of key-bolted joints. On longer runs, this conveyor operates from a small secondary electric motor.

According to company officials, the ingenious little excavating instrument was responsible for getting heavy 84-in. reinforced-concrete pipe under a tricky railroad embankment without trouble or delay. After the job was finished, the Mole was brought back into the Phoenix headquarters yard, where it's now in hibernation waiting another chance to pull a similar job out of trouble.

Equipment Supt. Bud Mentzer shows how an Erector set was used by Fisher personnel to build a prototype of the Mole.

Big idea?

The biggest. This is an artist's conception of the largest mobile land machine in the world... a mammoth stripping shovel now being built by Bucyrus-Erie for Peabody Coal Company, St. Louis, Missouri.

It will move a half-million pounds in every bite... 36 million cubic yards a year... uncover enough coal in a day to neat 7,500 average homes for one month.

Most important, it is expected to lower the cost of mining deeply buried coal which otherwise could not be recovered by strip mining methods.

Big idea?

Big enough to be a major breakthrough in excavator design... and just one of the examples of Bucyrus-Erie's *stepped-up pace of progress* in The Sixties.

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Equipment You Ought to Know About

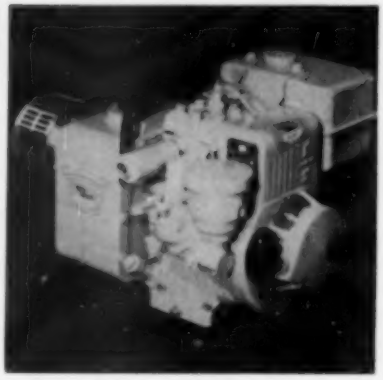
Centrifugal Pump

Manufacturer: Pacific Mercury Co., Department EE, 13232 Leadwell, North Hollywood, Calif.

Claims: Pacific Mercury is entering the centrifugal, self-priming pump field with two carryable models that are so light they can be carried with one hand. The model 5M pump, for example, weighs just 42 pounds, yet it combines the durability of an iron volute with the lightweight advantage of an aluminum body.

A special patented design eliminates the check valve and peeler. Both the 5M and 7M models have four-cycle engines with automatic recoil starter, oil bath air cleaner, suction strainer, shock-absorbing rubber mounts, convenient carrying handle, replaceable wear plate and replaceable iron volute. A patented impeller design keeps the seal free of debris and dirt.

The model 5M, a 1½-in. model,



has a full 3-hp engine and will pump more than 5,000 gallons per hour; the 7M, with 2-in. suction and discharge, pumps more than 7,000 gallons per hour. There is a friction-free, non-turbulent flow of water under all conditions.

Preco Control Available for L-W Motor Graders

Manufacturer: Preco, Inc., Department EE, 6300 E. Slauson Ave., Los Angeles 22, Calif.

Claims: Preco's "all-transistor" automatic blade-control is now available for installation on the LeTourneau-Westinghouse line of motor graders. According to a joint announcement by L-W and Preco, the control system can easily be installed on any new or used, current model L-W grader.

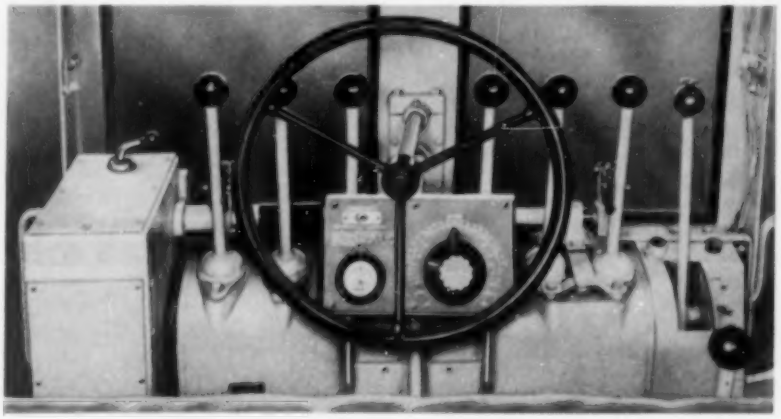
Through use of this accessory in every phase of operation from roughing-in to finishing, the productivity of the motor grader can be increased up to 50%, depending on the application. The motor grader operator's job is made easier, since the automatic control frees him from the necessity of constantly adjusting both left and right blade lift-levers in order to maintain the proper degree of transverse blade slope.

With the "Dial-A-Slope" control in operation, the operator needs to watch only one end of the blade and operate the lift-lever which controls it; the other end automatically takes care of itself, maintaining the blade slope the operator has preselected. The result is that the operator can concentrate his entire attention to steering and regulating his depth of cut.

Adaptation and installation of the unit, accomplished by a combined team of Preco and L-W engineers, provides maximum protection for the

mechanical and electronic components, while retaining the L-W grader's flexibility. The grader's ability to reach extreme banksloping positions and do all normal motor grader operations is unhampered by installation of the Dial-A-Slope control.

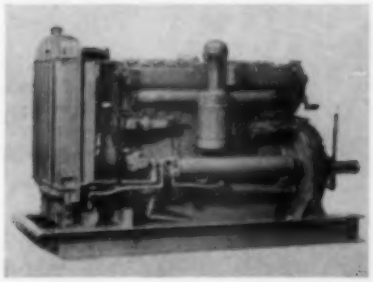
For operator convenience and to assure maximum accuracy in setting



and controlling slope angle, controls are located on a separate panel in the center of the cab directly in front of the operator.

The L-W Preco Dial-A-Slope control is now being serviced and sold, for factory or field installation, by all LeTourneau-Westinghouse distributors.

Diesel Engines



Manufacturer: Murphy Diesel Co., Department EE, 5317 W. Burnham St., Milwaukee 19, Wis.

Claims: Murphy has announced a new series of diesel engines and generator sets.

According to Murphy, MP engines are designed to put more power into a job. Company engineers explain that the total amount of power that goes into a job on any given day is determined by the engine's reaction to load changes and speed changes. This is determined by the torque characteristics of the engine. Only an engine with high rising torque can put more power into the job as needed.

Murphy says the MP diesels have the high rising torque necessary to take hold of a load and really hang on. This kind of lugging power helps keep equipment at the right operating speed for efficient production.

MP series engines and power units are available in sizes from 105 to 320 hp. MP series generator sets are available in capacities from 60 to 188 kw. Dual-fuel models and Mech-Elec units, capable of delivering mechanical and electric power simultaneously, are also available.

Black Powder

Manufacturer: Austin Powder Co., Department EE, Cleveland 13, Ohio.

Claims: Austin has begun manufacture of "B" black blasting powder and pellet powder. Black Powder will be offered in FF, FFF and FFFF

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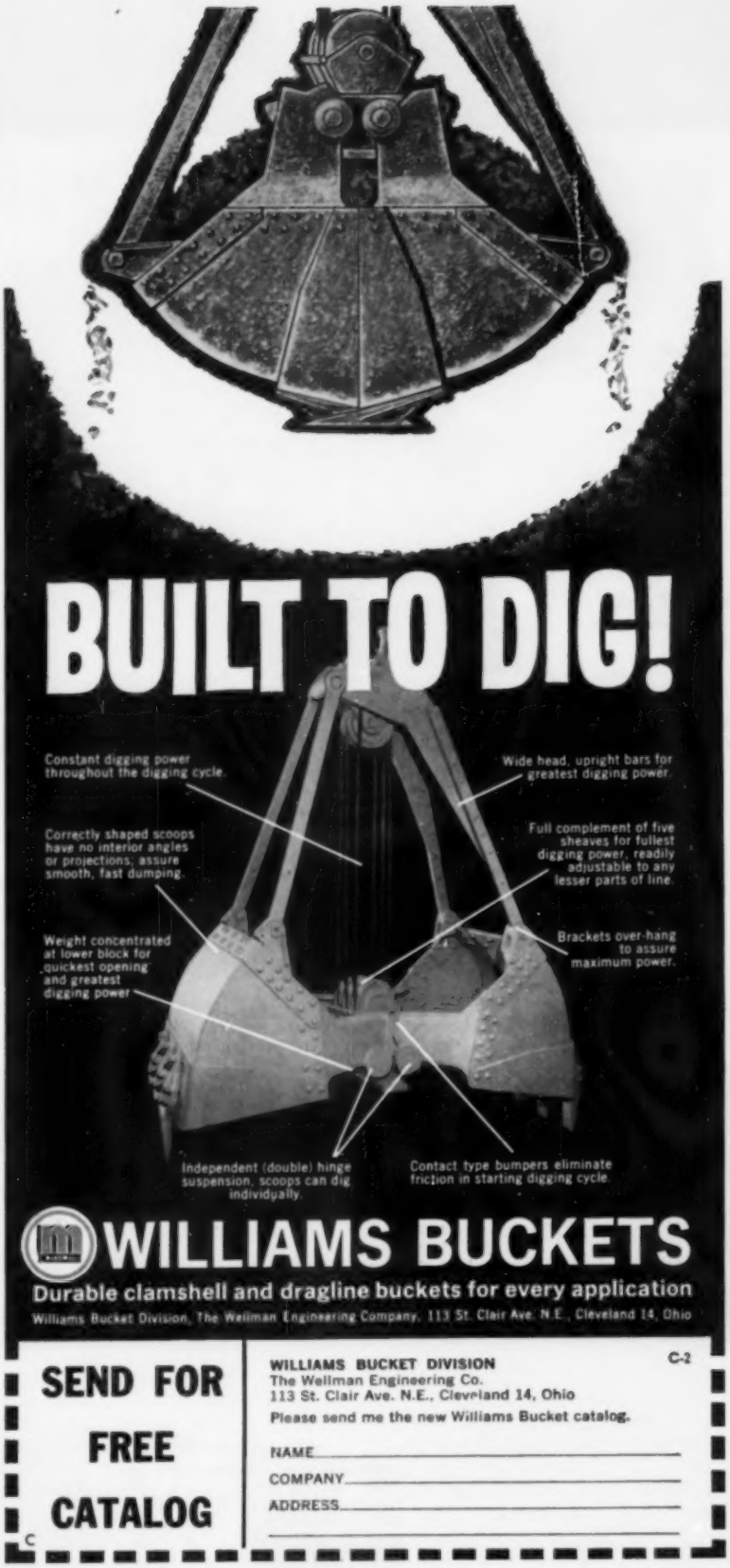
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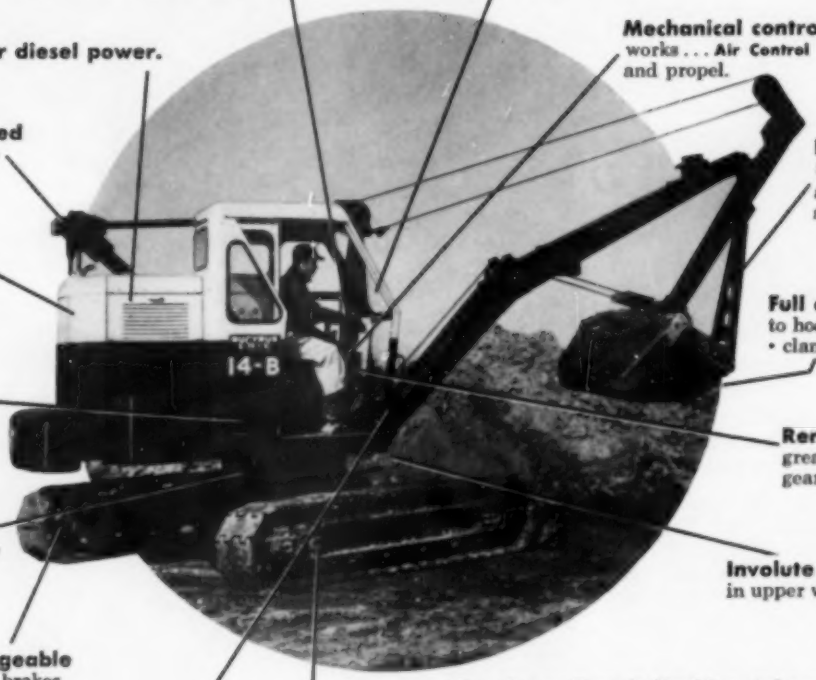
Direct drive, 3-speed transmission or torque converter drive.

Handles ½ and ⅝-yard dragline and hoe buckets to suit job conditions.

Full-paneled cab for easy access all around.

Full convertibility to hoe • crane • dragline • clamshell • shovel.



Enclosed gears on main machinery, running in oil.

Remote lubrication grease gun for swing gear and pinion.

Ball bearing swing circle adjusted for life at the factory.

Involute splined shafts in upper works and crawlers.

Identical, interchangeable operating clutches and brakes on main shafts.

Color code lube guide.

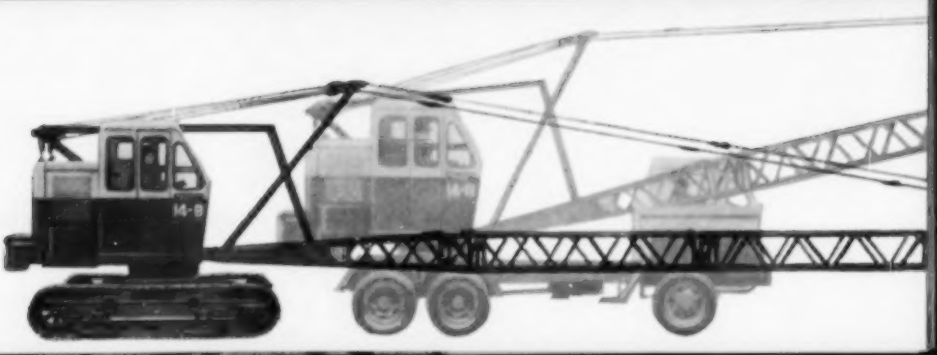
Crawler outriggers to boost standard crawler capacities by 15%.

Crawler or Transit Machine, take your choice and get the best buy on the market for *work* capacity and *lift* capacity and *profit* capacity in a price range that's the best news of all!

most respected name in the industry... BUCYRUS ERIE®

35E60

new 14-B



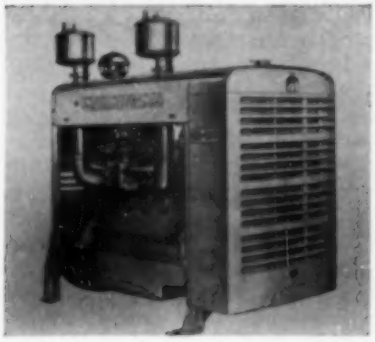
New Equipment . . .

Continued from page 55

grain sizes in 25-lb. kegs. Pellet Powder will be of the "standard" type and available in 1⅜-in. x 8-in., 1½-in. x 8-in. or 1¾-in. x 8-in. sticks packed in 50-lb. boxes.

Black Powders are used in open work where a slow heaving action is desirable. They are usually ignited with safety fuse or electric squibs.

International Engines



Manufacturer: International Harvester Co., Construction Equipment Div., Department EE, 180 N. Michigan Ave., Chicago 1, Ill.

Claims: Three new units have been added to the International line of six-cylinder carbureted engines.

The newcomers are the UR-372, UR-450 and UR-501 engines, which feature downdraft carburetion with velocity governor. The units have higher horsepower ratings than the current International models of the same displacement—U-372, U-450 and U-501—whose production will be continued. These engines have updraft carburetion with a gear-driven mechanical governor.

Maximum horsepower ratings of the newest power plants are 165 at 3,200 rpm for the UR-372; 182 at 3,000 rpm for the UR-450; and 212 at 3,000 rpm for the UR-501.

Among the features of the engines are full-flow oil filter for improved filtration and lengthened bearing life; ease of starting and dependable long-life ignition through improved distributor drive and high-capacity coil; and even-operating temperatures, with elimination of distortion, resulting from use of a new high-capacity water pump and revised water circulation system.

Satisfied Public Works Officials

comment on their Ellicott Dredges

Dayton, Ohio

Mr. W. T. Eiffert, Director, Department of Water writes, "We have never received such a complete piece of equipment, nor have we ever received such complete training in the operation of a new piece of equipment."

Blythe, California

Mr. O. E. Simmons, Manager, Palo Verde Irrigation District says, "All checks indicate that the dredge is exceeding the specified capacity. Our operators frequently comment on the simplicity of operation and the small amount of effort required to handle the control system."

Yaphank, New York

Mr. Albert Cass, Commissioner of Public Works, Suffolk County reports, "The versatility of our Ellicott 12" hydraulic pipeline dredge 'Shinnecock' has made possible a wide variety of local development projects."

Customer statements from all parts of the country and the world testify to the excellent design, quality and performance of Ellicott dredges and the service that accompanies them. These remarks concerning both standardized "DRAGON" models and the heavy duty dredges have come from both public officials and private owners.

If you are considering the purchase of a dredge, we will be glad to tell you more about what other owners of Ellicott dredges say, and provide technical details. Write to Ellicott Machine Corporation, 1619 Bush Street, Baltimore 30, Maryland.

2488

Marking Our 75th Year

ELLICOTT DREDGES

ELLICOTT MACHINE CORPORATION, Baltimore 30, Maryland, U.S.A.; Ellicott-Brandt, Inc., Baltimore, Maryland; Ellicott Fabricators, Inc., Baltimore, Md.; McConway & Torley Corp., Pittsburgh, Pa.; Timberland-Ellicott, Limited, Woodstock, Ontario, Canada; Dragues Ellicott France, Paris, France; Dragas Ellicott do Brasil Ltda., Rio de Janeiro, Brazil; Ellicott de Mexico, Mexico City, Mexico.

Successors to the floating dredge business of the Bucyrus-Erie Company and the American Steel Dredge Co. Complete engineering, design and construction service.

A new segmented steel insert in the top ring groove strengthens the top ring land, improving wear resistance and dissipating heat from the ring.

All six models are available with natural gas and LPG attachments.

The UR units provide excellent power for all types of pumping operations and blowers, while the three other members of the family, available with distributor or horizontal magneto ignition, are well suited for use with shovels, cranes and generators.

¾-Yd. Excavator

Manufacturer: Unit Crane & Shovel Corp., Department EE, Milwaukee, Wis.

Claims: Unit's model 1220 ¾-yd. shovel (convertible to crane, dragline, trenchoe, clamshell and magnet) offers excellent braking ability. It is equipped with a new 17¾-in. diameter by 5-in. wide brake.

Disc-type clutches are mounted on high speed countershafts instead of

Continued on page 59

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

New Equipment . . .

Continued from page 57

drum shafts for smoother operation and power. There are 44 large teeth in the newly designed clutch discs. Use of spring cups eliminate any clutch spring breakage.

Features of the 1220 include the

following: one-piece cast gear case enclosing all gears and shafts which operate in a constant bath of lubricant; straight-in-line mounting of gas or diesel engines with main machinery for immediate power action; full vision safety cab; six independently adjusted hook rollers; all-welded turntable; automatic traction brakes providing a friction-type locking device for both crawlers; splined shafts used throughout; and torque converter drive.

Independent boom hoist permits power raising and controlled lowering of the crane boom at high speeds.

4,000-Lb. Capacity Loader

Manufacturer: Allis-Chalmers Mfg. Co., Department EE, Milwaukee 1, Wis.

Claims: Allis-Chalmers' new TL-12 front-end wheel loader offers increased capacity and speed. The four-wheel drive loader has a carrying capacity of 4,000 pounds and a static lifting capacity of 9,500 pounds.

The new TL-12 has the power reversing Tractomatic transmission with a lever on the steering column to control both forward and reverse movement without stopping the machine to clutch and shift gears.

Four speeds forward are provided to 21.2 mph, and four reverse speeds to 27.9 mph. Reverse speeds are approximately 30% faster than the forward speeds in the same gear. This design permits a faster loading cycle without shifting to a higher gear to achieve the same effect.

The transmission, coupled with a 13-in. single-stage torque converter having a 3 to 1 ratio, assures correct operating speeds for every job and condition.

The transmission also has an automatic clutch cut-off which disengages the clutch when the brakes are applied. It has the effect of placing the transmission in neutral, thereby diverting full engine power to the hydraulic system for faster loading and dumping.

The TL-12 is available with either Allis-Chalmers 77-hp gasoline or 76.5-hp diesel engines. Shipping weight of the diesel-powered loader is approximately 11,550 pounds.

Four buckets are available for the unit, ranging from 1 to 2-yd. capacities. Choice of buckets depends upon the weight of the material to be carried and the working conditions. Bucket tip-back at carrying height is 47° and there is up to 14,500 pounds of breakout force at the cutting edge.

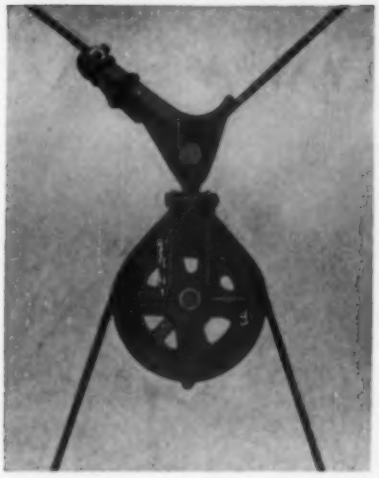
The hydraulic system is fully enclosed and protected. Hydraulic oil is triple-filtered to remove foreign material by full-flow micronic, magnetic and wire mesh filters.

Maximum dumping clearance under the cutting edge is 8 feet 4 inches. Under the hinge pin it is 10 feet 3 inches. At maximum dumping height, reach from the front of the tires to the cutting edge is 2 feet 8½ inches.

Four-wheel hydraulic power boosted brakes are standard equipment. There is also a mechanical parking brake.

Optional equipment includes special tires (12.00 x 24 tires are standard); hydraulic system accumulator; all-weather steel cab; heater and defroster. Attachments include backhoe, lift fork, crane hook, backfiller blade and bucket teeth.

Bridle Hitch Clamp



Manufacturer: Sauerman Bros., Inc., Department EE, 622 S. 28th Ave., Bellwood, Ill.

Claims: A new Sauerman fitting provides a quick way of attaching a load to a bridle cable. The wedge-type clamp holds the load securely on the bridle. Its saddle groove is an ideal bearing for the bridle cable and provides a smooth transfer of the transverse load. The bridle hitch clamp has a pin connection for attaching a wire rope block or other load.

The three-part fitting consists of a wedge clamp, wedge and cable clip. To attach the load to the cable, the wedge clamp is placed on the cable with the small end in the direction of the cable pull. The wedge is then inserted. The cable clip passes through the eye of the wedge and locks it in place.

The bridle hitch clamp is available in sizes for ⅜-in. or ¾-in. wire rope. Other continuous cable clamps are manufactured by Sauerman for rope sizes from ⅜ to 1¼ inches.

SIDE DUMPS
for ROCK, EARTH, ORE

PAN TYPE
truck bodies and trailers
14 to 45 TONS
dumped by EASTON electric overhead hoist

DROP DOOR
truck bodies and trailers
14 to 40 TONS
dumped by integral hydraulic body hoists

SIDE DUMP
TRAINS
pan type and drop door
capacities unlimited

Variable Wheel Base
REAR DUMPS
capacities
22 and 35 TONS

★★★★★★★★★

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

★★★★★★★★★

WRITE FOR CATALOG **A**

B-1084

EASTON®

NOT in the Contract

Two business partners were fishing in a small boat. Suddenly a storm came up. The boat capsized, and the two men found themselves in the water. One began to swim, but the other had all he could do to tread water. He was splashing and sputtering helplessly.

"Say, Harold," the swimmer said to his sinking partner, "can you float alone?"

"You crazy?" the partner yelled. "I'm drowning, and you talk business!"

Steno: "My girl friend is a twin."

Switchboard operator: "She is? How can you tell them apart?"

Steno: "Her brother is built differently."

She: "Why did you park here when there are nicer places farther on?"

He: "I'm the impatient type. With me, this is a case of love at first site."

Two Irishmen, occupying adjoining cells in the death house at Sing Sing, had become fast friends during their stay there, so it was a sad time when the day of Mick's execution arrived. As the guards led Mick down the last mile to the electric chair, Tim tried desperately to think of something cheerful to say.

Just before Mick disappeared through the steel doors, Tim's face lit up with an idea. "Well, Mick, me lad," he shouted, "more power to ye!"

Little Mary: "Is pop the same man you married thirty years ago?"

Mom: "No, but that's all right—I'm not the same girl he married either."

Donnie, age five, is a TV fan. He knows all the sheriffs and cow rustlers and guntotin' rowdies. One morning his mother took him on her lap and said: "Donnie, I have sad news for you—I hope you will take it like a man—grandfather is dead."

Donnie stared thoughtfully for a moment, then bristled and said: "Who shot him?"

"Of course, I'm working enroute, J. B. I'm keeping my secretary busy every minute."

The tiny little wife dragged her drinking husband into court and demanded a divorce instantly. Trying to pacify her, the judge asked if her husband ever tried Alcoholics Anonymous.

The frail woman dabbed at her eyes and said, "I guess so, your honor, he'll drink anything."

Patient: "I don't seem to remember things any more."

Doctor: "How long has this been going on?"

Patient: "How long has what been going on?"

A missionary, lost in the African jungle, met a lion. Terrified, he fell on his knees and began to pray.

The lion fell on its knees beside him. The missionary cried in delight: "Brother, how delightful it is to join you in prayer when moments ago I feared for my very life!"

"Don't interrupt," the lion cried. "I'm saying grace."

One day a father decided it was about time he had a serious talk with his teenage son concerning life. A few minutes later he emerged from Junior's room, looking thoughtful and a bit shaken. "Mary," he said to his wife hesitantly, "who is Brigitte Bardot?"

Max, the shovel-runner, walked into a cigar store and said to the salesgirl, "I'd like to buy a carton of cigarettes."

The salesgirl smiled, said, "There are so many brands. Which one would you like?"

Max thought for a moment, then mentioned a particular brand, whereupon the following conversation took place.

Girl: "Do you want the soft pack or the crush-proof box?"

Max: "Soft pack."

Girl: "King-size or regular?"

Max: "King-size."

Girl: "Filter-tip or plain?"

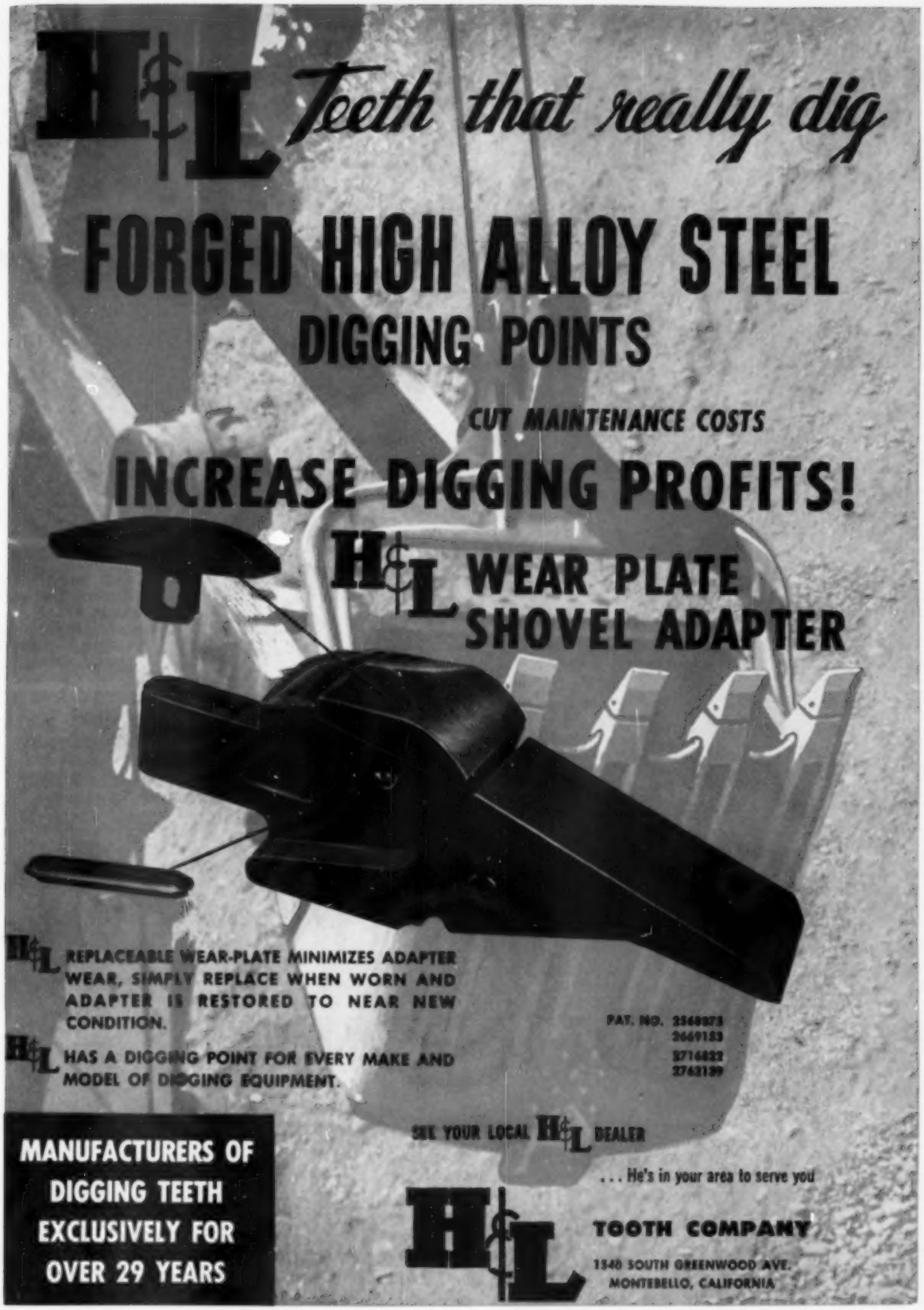
Max: "Filter-tip."

Girl: "Menthol or mint?"

Max: "Menthol."

Girl: "Cash or carry?"

Max: "Forget it . . . I've broken the habit."


H&L Teeth that really dig
FORGED HIGH ALLOY STEEL
DIGGING POINTS
CUT MAINTENANCE COSTS
INCREASE DIGGING PROFITS!
H&L WEAR PLATE
SHOVEL ADAPTER
H&L REPLACEABLE WEAR-PLATE MINIMIZES ADAPTER WEAR, SIMPLY REPLACE WHEN WORN AND ADAPTER IS RESTORED TO NEAR NEW CONDITION.
H&L HAS A DIGGING POINT FOR EVERY MAKE AND MODEL OF DIGGING EQUIPMENT.
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2669153
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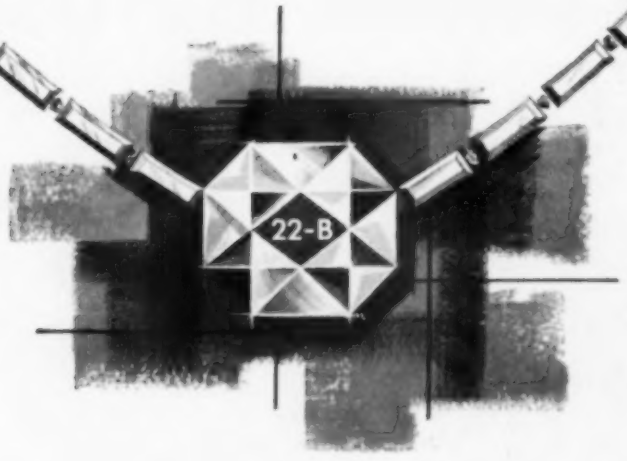
MANUFACTURERS OF DIGGING TEETH EXCLUSIVELY FOR OVER 29 YEARS
SEE YOUR LOCAL H&L DEALER
. . . He's in your area to serve you
H&L TOOTH COMPANY
1340 SOUTH GREENWOOD AVE.
MONTEBELLO, CALIFORNIA

CROWN JEWEL

IT'S



Torque converter drive with twin governor, dual control gives operator infinite control of power and speed settings (optional).

Larger capacity drums.

6 Adjustable hook rollers — large diameter and conical — compensate for normal wear. Adjustment is simple matter of removing shims.

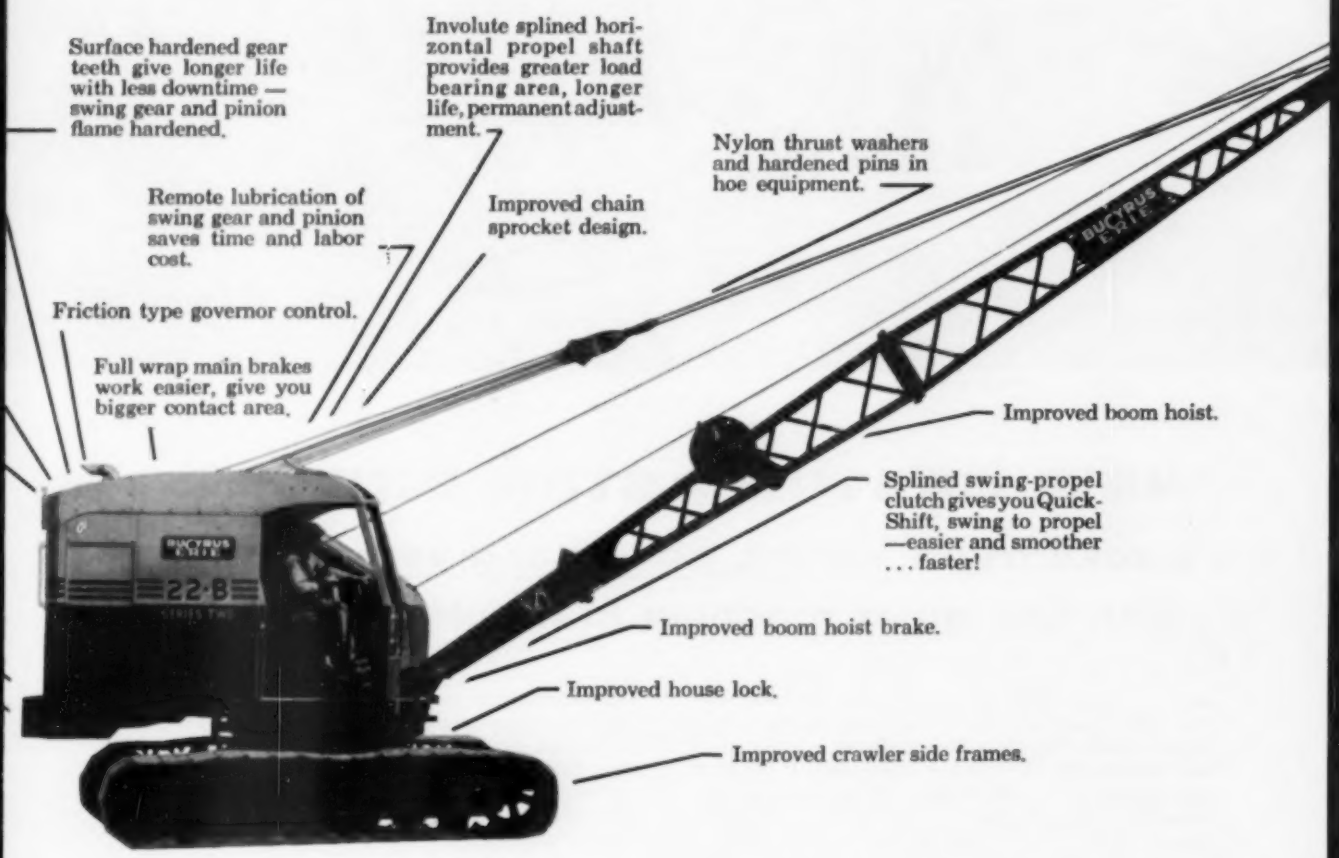
Sealed outer swing clutch bearings.

ANNOUNCES CHANGES!

THE Bucyrus-Erie 22-B, far and away the most famous and widely used crane-excavator in its class, continues to lead the field with major operational changes to match the stepped-up pace of current construction activity!

NOW THE SERIES TWO 22-B

...and these are the improvements for '60!


Surface hardened gear teeth give longer life with less downtime — swing gear and pinion flame hardened.
Involute splined horizontal propel shaft provides greater load bearing area, longer life, permanent adjustment.
Nylon thrust washers and hardened pins in hoe equipment.
Remote lubrication of swing gear and pinion saves time and labor cost.
Improved chain sprocket design.
Friction type governor control.
Full wrap main brakes work easier, give you bigger contact area.
Improved boom hoist.
Splined swing-propel clutch gives you Quick-Shift, swing to propel —easier and smoother ... faster!
Improved boom hoist brake.
Improved house lock.
Improved crawler side frames.
BUCYRUS ERIE
22-B

FOR ALL THE FACTS, see your Bucyrus-Erie distributor, or write to Bucyrus-Erie Company, South Milwaukee, Wisconsin ... *today!*

most respected name in the field

BUCYRUS ERIE®

19E60

NEW CRAWLMASTER DRILL

packs more weight, power and versatility than any other machine in its class

AT A LARGE Southern Granite Quarry, this Gyro-Flo powered Crawlmaster demonstrated its super-slugging power by out-drilling two larger-bore machines in competitive performance tests. With its new super-power D-525 Drill and constant-pressure hydraulic feed and retraction, the Crawlmaster rated highest in both average and maximum penetration in all tests. Capable of percussion, rotary or Downhole drilling of 4" to 6¼" holes in any position from vertical to horizontal, this 11-ton machine with dozer-type crawlers has the weight and stamina to handle the toughest drilling jobs. Features include all-hydraulic tower positioning, four 30" stroke leveling jacks, remote-controlled reverse rotation and simple ejector-type dust collector.

An Ingersoll-Rand 900-cfm Gyro-Flo rotary compressor provides ample power for all drilling and moving functions. With other interchangeable drill combinations, a 600-cfm unit is ample. But whatever the size, Gyro-Flo's traditional dependability, smoothness of operation and exceptional freedom from maintenance make it the ideal Crawlmaster power supply. Low oil consumption, air temperatures under 200°F and closer regulation all the way from no load to full load contribute to lowest possible air power costs.

Ask your I-R distributor or engineer for complete information on the cost-cutting Crawlmaster Gyro-Flo combination.

Ingersoll-Rand

66A14 11 Broadway, New York 4, N. Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK.

TO ADVERTISE: All advertising in this section is payable in advance. Rate $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters. Count spaces and punctuation as one character each. Be sure to enclose the correct amount of money with your order. Rates and conditions subject to change without notice. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the listed address. If box number is used, mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

EUCLIDS
Rear, Bottom and Scrapers

12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
3-yd. Bucyrus-Erie shovel.
2½-yd. Bucyrus-Erie shovel and dragline.
1½-yd. Bucyrus-Erie shovel.
5-yd. Manitowoc dragline.
6-yd. Lima dragline and shovels.
Large stripping shovels.
Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0523

1—Used Lima model 2400 5-cu. yd. shovel. Hamilton 400-hp diesel engine, high-lift front. New in 1950. Price, $100,000.

W. W. WILLIAMS CO.
833 Goodale Blvd. Columbus, Ohio
Phone CA 8-6651

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B-E elec. drag, 215', 12-yd.
450-W B-E diesel drag, 165' w/extra 10, 12, 13 & 14-yd. buckets.
9-W B-E elec. drag, 165', 10-yd.
9-W B-E diesel drag, 165', 12-yd.
7-W B-E diesel drag, 140', 7-yd.
7400 Marion diesel drag, 175', 13-yd.
7400 Marion elec. drag, 175', 12-yd.
1855 P&H diesel drag, 130', 10-yd.
625 Page diesel drag, 160', 9-yd.
621-S Page diesel drag, 125', 7-yd.
71-B B-E Crane w/160' boom.
200-W B-E diesel drag, 125', 6-yd.
2400 Lima elec. drag, 130', 6-yd.
2400 Lima diesel drag, 130', 6-yd.
4500 Manitowoc drag, 120', 5-yd.
120-B B-E elec. drag, 115', 5-yd.
71-B B-E elec. drag with 160' boom.
3900, 3500, & 3000 Manitowoc cranes.
111-M Marion drag, 100', 4-yd.
1601 Lima 4-yd. shovel/drag.
1055 P&H drag, 80', 4-yd.
1201 Lima dragline, 85', 3-yd.
54-B B-E drag, 80', 2½-yd.
5560 Marion 26-yd. elec. shovel.
190-B B-E 8-yd. elec. shovel.
151-M Marion 7-yd. elec. shovel.
1600 P&H 6-yd. elec. shovels.
170-B B-E 6½-yd. elec. shovel.
4161 Marion 6-yd. elec. shovel.
2400 Lima 6 yd. Std. & H.L. shovels.
120-B B-E 4-yd. elec. shovel.
1055 P&H 3-yd. H.L. shovel.
111-M Marion 4-yd. standard & H.L. shovels.
1201 Lima & 54-B B-E standard shovels.
#6 Northwest 1¼-yd. standard shovel.
Model T-650 Reich drill truck mtd. rotary and down-the-hole.
Ingersoll-Rand truck mtd. & crawler mtd. Drillmasters.
Keystone #50 truck and mtd. Stardrill.
Euclid trucks, rear & bottom dump; dozers, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa.
GLadstone 5-3658

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

H-EQ-1 hoe for H-3 Hydrocrane equipped with 18" bucket, 20" utilities dipper with side-cutters, ⅜-yd. clamshell bucket, tagline reel, 3¼" heavy-duty digging ram, new condition. Net cash price complete, $1,800.

SYRACUSE SUPPLY CO.
294 Ainsley Drive
Syracuse 5, New York

Lima ⅜-yd. shovel w/P.M.CO bucket—$1,000. Int. UD-14 power unit—$1,000. Lightning heavy-duty 6" sand and gravel pump—$400. All in good condition.

FRIHODA BROS.
Garwood, Tex. Phone: PL 8-3431

1—Link-Belt model LS-80 crane with 50' boom, Rudomatic tagline, Buda gas, s/n 7074.
1—Link-Belt model LS-60 hoe, Buda gas engine, s/n 8128.
1—Bucyrus-Erie 10-B gasoline powered combination dragline and clamshell, 28' boom, bargain price.
1—Bucyrus-Erie 10-B gasoline powered dragline, standard cats, excellent shape, s/n 20429.
1—Bucyrus-Erie 15-B dragline with 20" treads, GMC 2-71 diesel engine, s/n 75239.
1—Clark 10,000-lb. fork lift, solid tires.
1—Towmotor LT44 with pusher attachment on solid tires.
1—LeRoi 315 air compressor on 4 pneumatic tires, 7 or 8 years old.
1—Ruhr M-1—½-yd. heavy-duty grapple, new.
1—Wayne 36" rider industrial vacuum pick-up sweeper, demonstrator, 2 years old.
2—GMC Jetcretes with all accessories. Excellent condition, practically new with all extra accessories.
1—Used Kennedy-VanSaun revolving scrubber washer screen, 48" dia. x 21'0" long, in excellent shape and complete with all new parts including extra scrubber sections and new sizing screens.
1—Ford 1956—F-600 stake body truck, s/n F602N14988, air brakes, heavy-duty dump hoist, 2-speed rear and oversize motor.

S. M. CHRISTHILF & SON, INC.
Timonium Road and Harrisburg Expressway
Timonium, Md.

1—Northwest shovel 1½-yd. model 6, serial No. 15611 powered by Murphy Diesel model 20.
1—Northwest ¾-yd. dragshovel model 25, serial No. 25-12277 powered by Cat diesel.
1—Bucyrus-Erie model 10-B with 30' boom. Also available with hoe, ¾-yd.
1—Bucyrus-Erie 15-B ½-yd. hoe powered by Buda gas engine.
1—Bucyrus-Erie 15-B with Crane Boom.
1—Link-Belt shovel model K-570, 2¼-yd. powered by Cat diesel model 17000.
1—Lorain model TL-25K clamshell-dragline combination, powered by 3-cyl. G.M. engine with 70' boom, fairleads, Rudomatic tagline, wide shoes, long cats. Extra clean. Backhoe ¾-yd. available for this machine.
1—P & H model 255—45' boom with fairlead and ¾-yd. drag bucket, 19" tractor-type treads, Waukesha gas engine.
1—Insley ½-yd. hoe model K, powered by Buda gas engine.
1—Link-Belt shovel front for model LS-40, ½-yd.
1—Gardner-Denver model FYFXDE 7½x10" serial No. 131046 duplex pump, excellent condition $2,500

BEMISS EQUIPMENT CORP.
2219 Chamberlayne Ave.
Phone ELgin 9-5706

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

EXCAVATORS

1—Lima model 34 dragline powered by Caterpillar D318 engine. Machine is being priced as is where is. Chance for a real bargain.
1—Backhoe attachment for Lima 34 in very good condition. Can be adapted to other machines of this class.
1—Byers model 83-CC crane, 20-ton rating, mounted on Hendrickson crane carrier model 500E. Crane is equipped with 80' boom. Located at Phoenix.
1—Bucyrus-Erie 10-BTC equipped as hoe and dragline, powered by gas engine. A clean machine.
1—Lima 604 shovel, powered by Cummins HIS diesel engine. There is a lot of production left in this machine and it is priced for a quick sale. Located at Casper.
1—Link-Belt LS71 equipped as a dragline powered by Int. UD14A engine, 45' boom with pendant suspension. A very clean machine.

ASPHALT EQUIPMENT

1—848 Barber Greene asphalt plant, equipped with feeder, bucket elevators, rotary drier, gradation unit, dust collector, pug mill, Cleaver Brooks steam boiler, G. M. model 4-71 engine, Caterpillar model D13-000 engines, also electric motors, wiring cables and panels that make this plant complete. We welcome inspections of this plant.

TRUCKS, SCRAPERS AND BOTTOM DUMPS

3—LeTourneau Super C Tournapulls, tires range from fair to good. These machines are all capable of operating. Located at Casper.
2—Caterpillar DW20 scrapers. You will want to check the price and condition of these machines if you are in the market for scrapers.
1—Euclid model S-12 powered with GM diesel. A near new machine.
2—Allis-Chalmers TS-300 scrapers powered by 6-71 GM diesel engines. Priced for quick sale.
2—Euclid model 23TDT bottom-dumps, with GMC 6-110 engines. Allison Torqmatic transmissions. New in 1957. Very good appearance. Located in Los Angeles.
2—Euclid model 91FD rear dumps, 15-ton capacity. New in 1958. Priced for quick sale. Located in Los Angeles.

TRACTORS

1—Allis-Chalmers HD-21 equipped with front and rear push blocks, 24" pads, Twin Disc torque converter. We have repaired undercarriage, engine was rebuilt by previous owner and used approximately 1,000 hours.

MISCELLANEOUS EQUIPMENT

1—Model 200 Parsons trencher, powered by UD9 Int. engine, 21" wide buckets, crumber and cab.
1—Woods Roadmixer model 54 powered by Chrysler industrial engine P.T.O. for DS.
1—Buda generator model P.C.D.—1879 BM-D 3091-C Novo gas starting engine connected to Westinghouse generator AC 440 volt, 390 amps, 3 phase, 60 cycle Westinghouse excitor. This unit is ready to go to work.

THE COLORADO BUILDERS' SUPPLY CO.
1534 Blake Street Denver 2, Colo.

Bucyrus-Erie 35-ton Maxi-mounted 30-B wagon crane G.M.C. diesel power, 50' boom, independent propel, excellent condition, available immediately.

J. P. WAITE, INC.
3301 W. Pierce St. Milwaukee, Wis.
Phone: EV 4-1900

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie model 10-B dragline, serial No. 88586, with Buda gasoline engine, 28′ crane boom. Good working condition $3,500

Bucyrus-Erie model 22-B shovel, serial No. 18844, with Waukesha gasoline engine. Good condition throughout and ready to work $7,850

Bucyrus-Erie model 22-B combination clamshell & crane, serial No. 104362, with Caterpillar D318 diesel engine, 50′ boom, counterweights. Being rebuilt in our shop.

Bucyrus-Erie model 38-B 1½-yd. shovel, serial No. 112162 with Caterpillar D13000 diesel engine, Kohler light plant, standard crawlers with 33" treads. Location—northern New Jersey.

Bucyrus-Erie model 51-B 2½-yd. shovel, serial No. 62581 with Caterpillar D17000 diesel engine, standard crawlers with 36" treads. Low hours. Reconditioned and in very good condition throughout ...$40,000

Bucyrus-Erie model 54-B 2½-yd. shovel, serial No. 22854 with Buda diesel engine, standard crawlers. Machine in working condition. Location—northern New Jersey $15,000

Unit model 614 ½-yd. backhoe, serial No. 50062 with 2-71 G.M.C. diesel engine. Good condition throughout $7,850

Unit model 617 ⅝-yd. cambered boom backhoe, serial No. 54125 with G.M.C. diesel engine with torque converter, extended crawlers with 22" treads. Reconditioned throughout $10,500

Bay City model 45 ¾-yd. backhoe, serial No. 5993 with Caterpillar diesel engine, standard crawlers. Reconditioned and ready to work $13,750

Northwest model 25 ¾-yd. backhoe, serial No. 16381 with Caterpillar D318 diesel engine. Only 2,800 hours use. Reconditioned and ready to work $16,750

Lorain model L50K combination dragline, clamshell and crane, serial No. 25544 with Caterpillar D318 diesel engine, 60′ crane boom with 1¼-yd. dragline bucket. Reconditioned and ready to work $16,500

Lima model 802, year 1949, serial No. 5145. Caterpillar D17000 diesel engine, Kohler light plant, combination dragline and clamshell, 60′ boom, extended crawlers, 36" treads. Recently completely rebuilt $39,750

Lima model 1201, year 1954, serial No. 329514. Cummins LI diesel engine, Kohler light plant, combination dragline, clamshell, 80′ boom, high gantry, extended crawlers, 40" treads. Good condition $63,500

Marion model 93M, year 1948, serial No. 85G104 2½-yd. shovel, Caterpillar D17000 diesel engine. Machine in working condition. "As is." Machine location—Buffalo, N. Y. Open to offer.

Bucyrus-Erie Hydrohoe attachment for H-3 Hydrocrane complete with 18" general purpose dipper, 20" utility dipper, 12" narrow dipper and all necessary fittings. Excellent condition. Complete $750

Bucyrus-Erie 22-B shovel front complete with dipper trip, chains and lagging. Good condition $1,500

Lorain ¾-yd. shovel front, Ansco bucket complete with dipper trip. Excellent condition throughout $1,500

Lorain 1-yd. shovel front complete with dipper trip. Very good condition $2,000

Bay City 45 ¾-yd. shovel front complete with dipper trip. Good condition ...$1,500

BINDER MACHINERY CO.
Brighton St., Union, N. J.
MUrdock 8-0060

Schield-Bantam M47 mounted on KB6 Int. tandem with rebuilt motor. Crane equipped with backhoe, dragline, clamshell, 30′ boom, and 8′ jib. This outfit has been freshly painted and is in good condition.

HILTON R. JANNUSCH
Wenona, Ill.

38-B straight boom 1½-cu. yd. hoe attachment.

54-B bare boom, 60-ft., no point sheaves. In excellent condition.

Northwest model 25 shovel with Caterpillar diesel engine. Serial No. 9288.

Koehring model 205 shovel and hoe—½-yd., serial No. 5262C, powered with International gas engine #17366. 1948 model.

Lorain model L-41 hoe with Waukesha gas engine. Serial No. 17832.

Unit model 1020 ¾-cu. yd. shovel, Serial No. 51256, powered with Chrysler gas engine.

Insley K12 ½-yd. hoe, serial #3671, powered with Buda engine.

CLYDE EQUIPMENT CO.
3419 First Avenue South
Seattle 4, Wash.

1—Bucyrus-Erie 22-B dragline, long-wide-low crawlers; 35-ft. boom; GM 371 diesel engine. s/n 63122.

1—Sargent ⅝-yd. model 410 crane, s/n 10375, mounted on GMC 6x6 truck.

1—Link-Belt YC-5 yard crane, s/n 2YB412.

1—Allis-Chalmers TS-360 motor scraper, s/n 1673.

2—Allis-Chalmers TS-300 motor scrapers, s/n 1045 & 1046.

1—Allis-Chalmers TS-260 motor scraper, s/n 2631.

1—Allis-Chalmers TS-200 motor scraper, s/n 2293.

Priced to Sell! All equipment in excellent condition and guaranteed.

SEABROOK MACHINERY, INC.
625 W. Gaines St. Phone: 2-3100
Tallahassee, Fla.

Lima model 34 crawler-mounted clam-digging-hoe combination, Buda gas engine, 35′ boom, dragline fairlead, tagline reel, hoe boom with dipper. Priced to sell. Will sell with one or both attachments.

Unit model 357 rubber-tired wagon crane, equipped with new Chrysler Industrial engine, 25′ boom, tagline reel, overhauled machinery, repainted, excellent condition.

Lorain model 55 crawler-mounted shovel, equipped with UD-18 I.H.C. diesel engine. 25-ft. boom, tagline reel, overhauled machinery, repainted, excellent condition.

Bay City model 45 crawler-mounted dragline-clamshell machine, equipped with Cat D4600 diesel engine, long crawlers, 45′ boom, tagline reel, dragline fairlead. Hoe attachment available.

Gradall model 2460. New in 1957, equipped with G.M.C. Series 3031C diesel engine on upper works. Mounted on Duplex 6 x 4 truck carrier. Included are 24" and 36" digging buckets and frost ripper. Machine in excellent condition and priced to sell.

Bucyrus-Erie model 22-B crawler-mounted hoe. Powered with Cat D318 diesel engine, long frames and wide treads. Cambered type hoe boom, ¾-yd. hoe dipper. Machine new in late 1955. Excellent condition.

Bucyrus-Erie model 22-B crawler-mounted shovel-dragline combination. GMC 3-71 diesel engine, 35-ft. dragline boom. Shovel attachment includes ¾-yd. shovel dipper.

Model 55 Lorain crawler mounted shovel, equipped with UD-18 IHC diesel engine, complete with 1-yd. shovel dipper, machinery partially overhauled and in operating condition. Make us an offer for parts or for use as a standby machine.

HYDROCRANES

Model H-2 Bucyrus-Erie Hydrocrane mounted on a Chevrolet truck chassis, equipped with 2-piece boom, rear outriggers, reel and bucket available. Priced to sell.

Model H-3 Hydrocrane, 1953, mounted on G.M.C. truck chassis. 2-piece telescopic boom, tandem outriggers, operator's cab, tagline reel, hose, ⅝-yd. Hydrocrane clamshell bucket. Recently overhauled. Very good condition.

Model H-3 Bucyrus-Erie self-powered Hydrocrane, 1955, mounted on Army surplus six-wheel drive carrier powered with G.M.C. engine. 2-piece telescopic boom, operator's cab, tandem outriggers, tagline reel with hose, ⅝-yd. clamshell bucket. Ford 4-cylinder Industrial engine on Hydrocrane upper works. Very good condition.

Model H-3 Hydrocrane, 1952, mounted on Ford truck chassis, equipped with 2-piece telescopic boom, operator's cab, tagline reel, ⅝-yd. clamshell bucket. Very good condition.

Model H-2 self-powered Hydrocrane, 1957, equipped with 2-piece telescopic boom, tandem outriggers, operator's cab with heater, reel and new style ⅝-yd. twin-ram clamshell bucket, mounted on I.H.C. S-172 truck chassis. Complete machine in like new condition at a reduced price.

ATTACHMENTS

Model 15-B shovel attachment including dipper.

Model 25 Northwest ¾-yd. shovel attachment, ¾-yd. dipper included.

Model 304 Koehring shovel attachment, ¾-yd. dipper included.

H-3 Hydrocrane attachment with dipper and all hoses and fittings.

Buckets, dippers, grapples.

J. P. WAITE, INC.
2304 W. Pierce St. Milwaukee, Wis.
EV. 4-1900

CLAMSHELL

Lorain 820, 2-yd. crane and clamshell, 65′ boom, pendant suspension, 34" tracks, Rudomatic tagline, Cat D13000 diesel engine, S/N 18523. Rebuilt and guaranteed. $33,000.

Bucyrus-Erie S/N 69159, combination drag-shovel, and clamshell, 26" tracks and 30′ boom, ⅝-yd. backhoe, tagline, Buda gasoline engine. As inspected. $12,500.

HYDROCRANE ATTACHMENTS

Bucyrus-Erie ⅝-yd. clamshell bucket with teeth for H-3 Hydrocrane—2 rams. Good condition. $550.

Bucyrus-Erie tagline reel, hose and fittings for H-3 Hydrocrane. Good condition. $225.

SHOVEL ATTACHMENTS

Bucyrus-Erie tunnel shovel attachment for 38-B, consisting of 15′ boom, 12′ handle, 1½-yd. dipper. Excellent condition. $4,500.

Bucyrus-Erie 38-B boom section, 20′ with pendants. Good condition. $590.

Northwest No. 25 fairlead attachment. Excellent condition. $520.

Lorain 820 fairlead attachment. Good condition. $550.

TRACTOR SCRAPERS

2 units Caterpillar DW21 tractor scrapers with #27 cable controls and Caterpillar #470 scrapers, complete with side extensions and cable savers. Capacity 29 yards heaped. Engines equipped with Turbo-chargers (345-hp). Tires—some new, balance, like new. All 28-ply. 30-day Bonded Guarantee. Will consider rental. $44,000 ea.

TRACTOR LOADERS

Caterpillar No. 933 Traxcavator, 13" triple grouser tracks, crankcase guard, oil clutch, electric starter and a 1-yd. bucket. Reconditioned. 30-day Bonded Guarantee. $8,500.

Allis-Chalmers HD-16G tractor-loader, S/N 1309, 20" triple-grouser tracks, crankcase guard, track roller guards, pull hook, 3-yd. bucket with teeth. Recond. 30 day guarantee. $19,500.

H. O. PENN MACHINERY CO., INC.
140th St. & East River New York 54, N. Y.

Lorain TL-20 combination crane and shovel with Cat D311 diesel engine. Ser. #18085. Price, f.o.b. Asheville, N. C. $5,500

Lorain TL-25S shovel with Cat D315 diesel engine. Serial #25164.
Price f.o.b. Charlotte, N. C. .....$8,000.

Northwest model 80-D shovel with 2½-cu. yd. Esco bucket, 30" treads, model 21 Murphy diesel engine. Serial #13119.
Price f.o.b. White Haven, Pa. .....$26,500.

Allis-Chalmers TS-360 motor scraper. Serial #1315.
Price f.o.b. Greensboro, N. C. .....$25,000.

E. F. CRAVEN CO.
P. O. Box 3307 315 S. Eugene St.
Greensboro, N. C.

1—Manitowoc 3600 3-yd. shovel, serial #36016, Cummins diesel engine, excellent. One year old. Loc. Cleveland, Ohio.

1—Bucyrus-Erie 10-B 25-ft. crane boom, w/fairlead. Good shape, but not painted. Loc. Cleveland, Ohio. $750.

1—Bucyrus-Erie 15-B hoe, serial #72905. Cat D315 diesel engine. Good shape. Loc. Cleveland, Ohio.

1—Link-Belt LS-71 ¾-yd. hoe, Cat D315 diesel engine. Very good cond. Loc. Columbus, Ohio. $14,500.

1—Lorain TL-20 clamshell crane, SN 15297, Waukesha gas engine, includes ⅝-yd. bucket. Loc. Cleveland. $10,500.

1—Koehring 16-E Twin-batch paver. In excellent shape. Used one job. $21,000.

1—Euclid 9-FDT 13-yd. bottom-dump hauler. Cummins diesel engine. In good shape. $10,500.

3—Euclid S-12 12-yd. single-engine scrapers. Have low hours. Excellent condition.

1—Unit 617 ½-yd. trenchoe. Rebuilt completely top to bottom. GM 3-71 diesel engine.

Pictures and/or complete description available on any item.

THE W. W. WILLIAMS CO.
835 Goodale Blvd. Columbus, Ohio
Phone: CApital 8-6651

FOR SALE

(FOR DELIVERY LATE SEPTEMBER)

CONVEYOR SYSTEM
from
TRINITY DAM PROJECT
(CALIFORNIA)
2 miles long
42" wide rubber belt

9 FLIGHTS—AVAILABLE INDIVIDUALLY. Flights range from 672 ft. long to 1885 ft. long. Conveyor moves approximately 1700 cu.yds. per hour of impervious fill material (weathered andesite) on 850 ft. drop at 720 feet per minute from borrow pit to earth fill dam. Five flights descend a 25% grade. Much of braking effort is from electric motors acting as generators under full belt load. Also mechanically operated brakes bigger than those of a power shovel. Conveyor has operated reliably on this three year job. Complete system includes the following:

LOADING STATION

Two drive-over hoppers with slotted tire track troughs for scraper discharge from borrow area.

SCREEN AND CRUSHING STATION

Charged by 48" belt. Feeds main belt and acts as upper end control station. Impactor type crushers with rolls on eccentrics reduce oversize to about 6"

NINE CONVEYOR FLIGHTS

Individual flight data provided on request. Motor sizes range from 30 hp to 300 hp. Total horsepower of entire conveyor is 3280 of which 2000 hp is within the regenerative system (5 flights on 25% grade) where power generated is fed back into main system. All flights but one employ gravity type takeups. Troughing idlers are 20°, 3 roll, 5" diameter spaced from 2.75 ft. to 4 ft. apart. Impact idlers are used at transfer points. Band type brakes are used on tail pulley shafts on all but one flight. In addition, thrustor brakes are mounted on the high speed shaft between gear reducer and motor on the 5 flights on the 25% grade.

TERMINAL STATION

Three bins with total capacity of 1000 cu. yds. can load three CAT DW20's simultaneously. Scraper can pull in, load and pull out in 20 seconds. Bins are charged from a 60" wide shuttle conveyor with water added. By-pass belt can stack material on ground. At bottom of each bin is a pair of 7 ft. opening roller gates operated by large size air rams. Material falls through gap into automatic weighing hopper. Air ram operated roller gates tripped to discharge 25 cubic yard loads.

16 mm color motion picture of conveyor available on request for private showing

Write • Wire • Phone

TRINITY DAM CONTRACTORS A JOINT VENTURE

10 WEST ORANGE AVENUE • SOUTH SAN FRANCISCO, CALIF. • PLAZA 6-0300 • EXTENSION 279

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Used Heavy-Duty Mining Equipment

1 — MACK 30-TON TRUCK
1 — INTERNATIONAL TD-24 TRACTOR
1 — ADAMS 8-TON MOTOR GRADER
2 — LE TOURNEAU 13 CU. YD. PAN SCRAPERS
3 — LE TOURNEAU 12 CU. YD. SCRAPERS
20 — EUCLID 15-TON TRUCKS

Although used, the above equipment has had excellent maintenance care. Still being in good operating condition, it offers many hours of additional service. For examination or further information, please contact:

J. M. MORRIS or J. P. SAVAGE
LONE STAR STEEL COMPANY
POST OFFICE BOX 12226
DALLAS 25, TEXAS

EQUIPMENT AT LONE STAR, TEXAS . . . LANDING STRIP (DC-3) AT PLANT

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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

SHOVELS, CRANES AND LOADERS

Two 40' crane booms for Bucyrus-Erie 22-B machines, used very little. Price FOB car, Libby, Mont. $1,150

P & H ¾-yd. shovel, serial No. 10758, with 55' crane boom, extra counterweight, tractor-type tracks with 20" flat grousers, two new rollers, tracks poor, powered with Chrysler Industrial ND12691 Power Unit, Serial No. 14381, 6 cylinder, 3 speed transmission, general appearance good. This machine could be adapted for truck mounting very easily and could possibly use for a season or more on the present running gear. Price, FOB car Kalispell. $5,750

Bucyrus-Erie 51-B, serial No. 98049 with Buda 6DC 1742 motor. This machine in good operating condition. Price, FOB, Butte, Mont. $36,800

Bucyrus-Erie 38-B combination shovel-dragline, serial No. 108729, with Caterpillar D13000 engine, 55' drag boom, 1½-cu. yd. drag bucket. Price FOB, Anaconda, Mont. $34,500

Northwest ¾-yd. model 25 shovel front in good condition. Price, FOB Kalispell. $500

Idaho type skidding jammer mounted on a Studebaker 4 x 6 truck, with reinforced frame, double American drums, Hercules gas power with four speed transmission, complete with blocks, cable and rigging. Good condition. Price, FOB Kalispell $3,000

Bucyrus-Erie 22-B with 50' crane boom, extra counterweight, Tagmaste, tagline, powered with a Caterpillar D-318 diesel engine, mounted on self-propelled carrier unit (Maxi-type) with 8 1400 x 20 tires. This machine completely rebuilt and in excellent operating condition. Price, FOB Kalispell $27,500

WESTMONT TRACTOR CO.
Box 1445 — 150 E. Spruce St.
Missoula, Mont.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie model 38-B, 1½-yd. dragline with long and wide track, 11'6" wide, 7'5" long, 33" pads, 70' boom, pendant suspension unit, 79 extra counter weights. Powered by IHC UD 1091 diesel engine. Total weight 109,360#. Replacement cost $60,915. Like new condition. 4 months of rental service is all this dragline has been used. $45,000 FOB Louisville, Ky.

Bucyrus-Erie model 51-B, 2-yd. capacity lifting crane with 100' boom and 20' jib. Long and wide under carriage, 40-ton sheave block. Powered by Buda model 6DCB diesel engine. Crane less than 2 years old, has been in our rental fleet, saw very little service, like new condition. Replacement cost approximately $82,000. $65,000 FOB Louisville, Ky.

Bucyrus-Erie model 38-B, 1½-cu. yd. shovel, powered by GMC diesel engine with torque converter. 1957 model. $40,000 FOB Elizabethtown, Ky.

Bucyrus-Erie model 22-B heavy-duty dragline, clamshell, 60' boom pendant suspension, lifting crane. Long and wide tracks, extra counter weights. Powered by IHC UD-525 diesel engine. Replacement cost $34,499. $22,000 FOB Louisville, Ky.

Bucyrus-Erie model 22-B, ¾-yd. capacity basic machine. Powered by IHC model UD-525 diesel engine. Less than 3 years old. Excellent condition. From our rental fleet. $18,750 FOB Louisville, Ky.

Insley ¾-yd. dragline with fairleads and 40' boom, powered by Caterpillar diesel engine. $8,500 FOB Elizabethtown, Ky.

Lorain model 820 2-yd. shovel, powered by Caterpillar D13000 diesel engine. $13,000 FOB Elizabethtown, Ky.

Lorain model 40, ¾-yd. shovel on crawlers. Powered by gasoline engine. $4,500 FOB Elizabethtown, Ky.

P&H model 255-A, ¾-yd. shovel, crawler mounted. Powered by Caterpillar 315 diesel engine. $14,500 FOB Elizabethtown, Ky.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Insley model ¾-yd. backhoe attachment. $1,200 FOB Elizabethtown, Ky.

Lorain model TL-20 dragline with 45' boom, Waukesha gas engine. Undercarriage rebuilt. Good operating condition. $7,000 FOB Evansville, Ind.

General model 307, ¾-yd. dragline with 45' boom and fairleads. Powered by Waukesha gasoline engine. $7,000 FOB Evansville, Ind.

Bucyrus-Erie model 15-B, ½-yd. dragline with 40' boom, fairleads. Powered by IHC U709 diesel engine, ½-yd. dragline bucket. $9,500 FOB Evansville, Ind.

Unit ½-yd. capacity shovel, powered by Chrysler Industrial gasoline engine. $3,750 FOB Evansville, Ind.

Write—Wire or Phone Jim Waddell

BRANDEIS MACHINERY & SUPPLY CO.
P. O. Box 1705 — MElrose 7-4741
Louisville 1, Ky.

MISCELLANEOUS EQUIPMENT

EXCAVATORS
Increase Your Income

Convert your spare time into steady income selling most popular line of belts and buckles with customer's personal initials, first name or nickname with miniature replicas of actual clams, shovels, draglines, backhoes, scrapers, bulldozers, graders, heavy dirt removers, etc., beautifully enameled aiso lapels, tie clasps, key chains, money clips, and cuff links. Excellent repeat business. We furnish you with refundable complete sales kit. Really nice part-time money producing items. For full particulars, write to

HOOK-FAST SPECIALTIES, INC.
Factory—16 Eudora St. — P. O. Box 1425-E
Providence, R. I.

ENGINES

Unused Buda gasoline model 6B220 serial 37114—6 cyl. 3⅞" x 4¼" complete with radiator, clutch and electric starting equipment. Suitable for 10-B, 22-T, 22-W, 24-L & 24-W. $650 FOB Erie, Pa.

Used Cummins diesel model LR-600 serial 89420—6 cyl. 7¼" x 10". Suitable for 88-B—FOB San Francisco, Calif. Contact J. E. Smart.

BUCYRUS-ERIE CO.
South Milwaukee, Wis.
Phone SO 2-6000

BARGAINS FOR 54-B BUCYRUS-ERIE SHOVELS

Used reconditioned dipper stick assembly, new racking, including end casting—$1,500. Used 2½-yd. reconditioned Type VII shovel dipper with bail, padlock and teeth—$2,500. Used 3-yd. Esco Mesabi shovel dipper with bail, padlock, teeth and extra door—$2,500.

CLYDE EQUIPMENT CO.
1631 N. W. Thurman St.
Portland 9, Ore.

TRACTORS

Caterpillar D9, torque convertor drive, 280 drawbar horsepower, double drum unit, dozer, rebuilt tracks and running gear 90% good. FOB car, Missoula, Mont. $29,500

Caterpillar D8 tractors, serial No. 13A2894, dozer, front cable control, Rivinius power steering on steering clutches, new tracks, remanufactured. FOB car, Missoula $20,000

Caterpillar D8 tractor, serial No. 2U22937, with dozer and double drum cable control, oil clutch tractors, undercarriage 80% good. All checked over and in good operating condition, guarded up, necessary repairs made. FOB car, Kalispell, Mont. $18,500

Caterpillar D7 tractor, 3T Series, Cat angle dozer, double drum cable control, general running condition good, tracks poor, but serviceable. FOB car, Missoula $3,750

Caterpillar D6 tractor, 9U20000 Series, equipped with a Cat angle dozer and double drum cable control. FOB car, Kalispell $5,000

MISCELLANEOUS EQUIPMENT

Caterpillar D4 tractor, 6U Series, checked over necessary repairs made, dozer, starter repaired, Kay-Brunner angle dozer, LeTourneau cable control single drum, rear mounted. Good running condition. FOB car, Missoula $3,250

Caterpillar D8 tractor, 14A3440, No. 30 front cable control 8A angle dozer, Hyster Hyspeed skidding winch, machine completely rebuilt, operator guard, final drives repaired, new tracks installed, new running gear, rebuilt, engine overhauled, price, FOB car, Kalispell $26,750

Caterpillar D8 tractor, 13A3637, front cable control, 8A dozer, Hyster Hyspeed winch, Hylift dozer mount, all steel operator guard, completely overhauled, including rebuilt running gear and new tracks, excellent operating condition, price, FOB car, Kalispell $19,750

Allis-Chalmers HD-6G shovel loaders, good operating condition, pin and bushings turned, running gear repaired, lift cylinders repaired, all necessary repairs made. Price, FOB car, Missoula $8,250

International Harvester TD-6 tractor, serial No. TDBK2843, track, radiator, crankcase guards, overhead guards, straight blade hydraulic with tilt, checked over, necessary repairs made. FOB car, Missoula $2,000

International Harvester TD-14 tractors, serial No. TDF241832, equipped with Isaacson cable controlled angledozer and double drum winch, operator guard, roller and crankcase guards, engine, clutch transmission overhauled, rebuilt rollers and idlers, new rails, grousers rebuilt, excellent operating condition. FOB car, Missoula $7,750

ROAD MACHINERY

Wooldridge ripper, 2-teeth equipped with Caterpillar No. 18 wheels and two new shanks, adapters and points, over $500 repairs in these parts. This is about the size of a Caterpillar No. 18 ripper. Price, FOB car, Missoula $1,750

LeTourneau model H3C ripper. Serial No. R5967, equipped with two teeth, two tips 50% good. Balance of ripper in good condition, complete with cable. FOB car, Kalispell $1,000

Caterpillar No. 12 motor grader, 8T-2838, remanufactured—new recaps on all wheels, cab, power steering. This machines is in excellent operating condition. Price, FOB car, Missoula $13,500

Caterpillar No. 12 motor grader, serial No. 8T-2703, equipped with cab, scarifier, lights, heater, power steering, good tires. Put over $1,950 in repairing the machine, consider it in excellent operating condition. FOB car, Missoula $11,000

POWER UNITS—ELECTRIC SETS

Caterpillar model D-337 power unit, serial No. 22B-751, "Y" Arrangement, with outboard bearings, integral fuel tank, engine completely overhauled approximately 500 hours ago. Excellent operating condition. FOB car, Kalispell $4,000

Caterpillar D13000—Y power unit, serial No. 485157 SP, with outboard bearings, integral fuel tank, steel skid mounted, starting engine rebuilt, balance of unit checked over, repaired as necessary. FOB car, Kalispell $2,250

Kohler 32-volt model E36A D.C. light plant, No. 132394, 1.5 KW, 40 volt, D.C.—32-volt battery, 38-amp per terminal, 1000-rpm, battery charger controller and 16 Delco Light KXG 17240 glass batteries, excellent condition. Price, FOB car, Kalispell..$150

WESTMONT TRACTOR CO.
Box 1445 150 E. Spruce St.
Missoula, Mont.

BIT FURNACE

Sunbeam Stewart, gas fired. Three chambers 9" dia. x 13" deep; complete with motor, blower, and controls, and feed rack with carriages for each opening. New 1956, used very little and in excellent condition. Located Evansville, Ind. Contact J. E. Smart.

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South Milwaukee, Wis.
Phone SO 2-0900

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
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DRAGLINE BUCKETS

Notes from the Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has named Charles D. Moore as sales manager for products of its Construction Machinery division at the Minneapolis (Minn.) branch. Moore had served in that capacity since 1958 at the company's branch in St. Louis, Mo.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Cate Equipment Co., Salt Lake City, Utah, as distributor for its crane-excavator and Hydrocrane lines. Cate's territory will include the entire state of Utah; the counties of Elko, White Pine and Eureka in Nevada; and Unita and Lincoln in Wyoming. The distributor's main office and facilities are located at 1132 S. 4th St., Salt Lake City.

Macwhyte Wire Rope Co., Kenosha, Wis., has announced the appointment of Russell F. Hendrick as assistant Pacific Coast manager. Hendrick has been associated for many years with the wire rope industry, both with a manufacturer and more recently conducting his own distributorship of wire rope and allied products. His headquarters will be the company's offices in San Francisco, Calif., and he will assist Fred M. Sime, Pacific Coast manager, in the 13 western and Pacific Coast states.

Marion Power Shovel Co., Marion, Ohio, has announced two new executive appointments. Myron (Mike) Geller, formerly sales manager for small machines, has been named to the newly created position of administrative engineer and will work with the company's full product line. Anthony M. Colatrino has joined Marion as sales manager for small machines.

Spare the Chisel
Save the Parts
USE
KROIL
Don't ruin a valuable piece of equipment merely because some part is rusted tight. Apply Kroil, the amazing new chemical lubricant that creeps into millionth inch spaces (proved by laboratory tests), dissolves rust, supplies necessary lubrication and
LOOSENS FROZEN PARTS
18,000 of America's leading plants can't be wrong! They have used KROIL for 10 years and are still depending on it to save expensive labor and valuable parts. They say: "Kroil loosened bushings after a 12-ton press had failed" . . . "on repairing heat treat trolleys formerly destroyed every nut. Now Kroil saves them all, and time, too" . . .
You too should be using KROIL every day. Try it on money-back basis. Gallon $4.35; with Kroiler trigger squirt gun (shoots a drop or a stream 15 feet, if desired) $5.25; f. o. b. our factory.
KANO LABORATORIES 1083 Thompson Lane, Nashville 11, Tenn.
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New Trade Literature

Subject: **Crane-Excavator**

Content: A 20-page catalog describes and illustrates features of the American 200 series crawler crane-excavator. The main topics include the new positive-pressure hoe and the rope-crowd shovel attachment. Ask for catalog No. 720-CG-3.

Where to get: American distributors or American Hoist & Derrick Co., Department EE, 63 S. Robert St., St. Paul 7, Minn.

Subject: **Eimco Loader**

Content: Facts and specifications are contained in a four-page brochure on the Eimco 126 front end loader. The crawler unit has the 205-hp General Motors 6V-71 diesel engine teamed with Eimco's "Unidrive" transmission, a single-stage torque converter and dual final drives. The brochure dramatically illustrates the spin-turn ability of this machine. It lists the features, loading cycle speed and full English and metric specifications of the unit, which has a maximum breakout force of 40,000 pounds. SAE rated bucket capacity is 2¼ yards with a heaped capacity of over three yards. Ask for bulletin L-1092.

Where to get: Eimco Corp., Department EE, P. O. Box 300, Salt Lake City 10, Utah.

Subject: **Lifting Crane**

Content: Koehring's 330 "Sprawler"—a crane able to lift up to 30 tons, or 2½ tons more than its own working weight—is described in a 6-page booklet. Features illustrated include pivoting outriggers which give machine its great lift capacity; one-piece carbody and crawler; self-cleaning crawler system; enclosed gears; and smooth swinging hook rollers. Also included are schematic diagrams of the power flow in both upper and lower machinery, and a description of how the Sprawler can be quickly stripped down to about two-thirds of its working weight for transport.

Where to get: Koehring Div., Koehring Co., Department EE, 3026 W. Concordia Ave., Milwaukee 16, Wis.

Subject: **Rock Bits**

Content: Joy has released a 4-page bulletin on tungsten carbide rock bits. Bottom drive, shoulder drive, and taper socket bits are illustrated and explained. A simple chart provides selection data for all types of bits made by the company, and includes information on cross and X-type bits, diameters and thread types. Ask for bulletin NR-87-C.

Where to get: Joy Mfg. Co., Department EE, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Subject: **Off-Highway Truck**

Content: International's model 95 Payhauler, a 27-ton rear-dump, off-highway truck, is featured in a 16-page catalog. The truck is powered by the International DT-817 turbocharged engine—a six-cylinder diesel unit developing 375 horsepower at 2,100 rpm. Design of the truck's body trims gross vehicle weight by 5,000 pounds through use of rock-ribbed corrugations possessing three times the strength of flat steel plates. Standard or quarry bodies are available. Ask for catalog CR-743-I.

Where to get: International construction equipment distributors or International Harvester Co., Department EE, 180 N. Michigan Ave., Chicago 1, Ill.

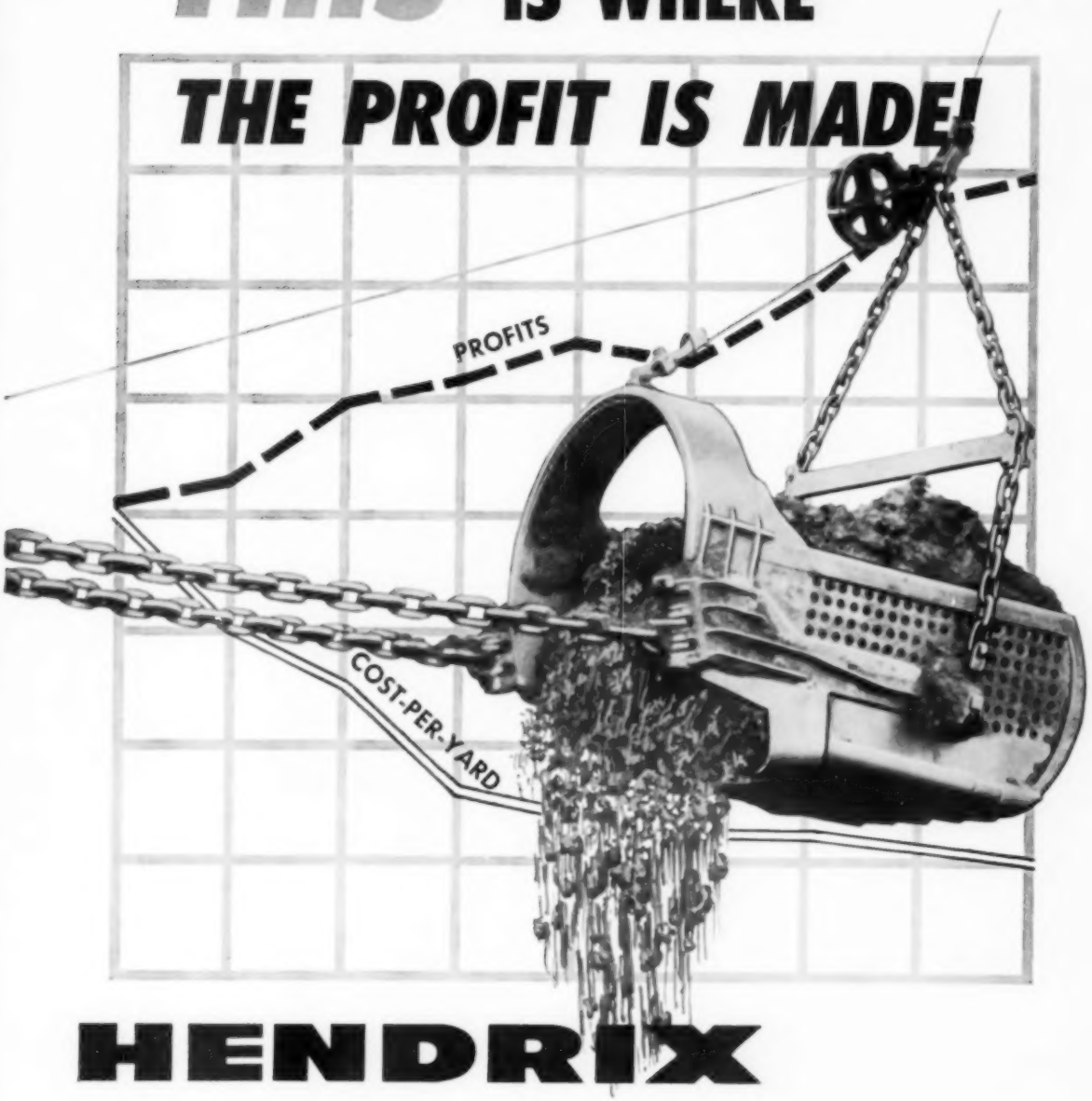
New Movie . . .

Subject: **Accident Prevention**

Content: A 27-minute sound-color film points up the need for safety precautions on construction jobs. The title of the movie, *The High-Low Bid,* states its main purpose—to convince contractors that safety performance has a great bearing on their operating success; that if accident controls are not firmly established, overall production costs can be so much affected that a contractor's job bidding is no longer competitive. Typical scenes show slack housekeeping practices, and how simply they can be corrected. The film was produced by Employers Mutual of Wausau in cooperation with the Milwaukee (Wis.) chapter of the Associated General Contractors of America. It is the first in a series of three safety movies on the construction industry that will be produced by the Wausau insurance firm.

Where to get: Employers Mutuals, Department EE, Wausau, Wis., or company representatives.

THIS IS WHERE THE PROFIT IS MADE!



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DRAGLINE BUCKETS

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

Hendrix Lightweight DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

Parts you can trust
... cost less per hour

Converting to Lifetime Lubricated Track Rollers costs less than you think

Lifetime Lubricated Roller Groups, including seals, shafts and end collars, *cost only a little more* than ordinary Bellows Seal Rollers without end collars. But this small expense of *initial* installation rapidly disappears through noticeably lower owning and operating costs.

Based on savings from seal replacement alone, Lifetime Lubricated Rollers soon make up the difference. The metal rings of the Floating Ring Seal can be used over and over again. Take a 14-roller D8. At every roller rebuild, you probably have to buy 28 bellows seals @ $3.97* each or a total of $111.16. Compare this with the rubber "O" rings costing a total of only $45.08*. You save $66.08 in seal replacement costs every time you rebuild or replace. Similar savings are available on all models. And, replacement Lifetime Lubricated Roller and shaft assemblies without end collars are priced below those of Cat Bellows Seal Rollers.

But your savings don't end here! Here are other benefits you get from Lifetime Lubricated Track Rollers:

1. Longer Lived Roller Shells and Component Parts. The Lifetime Lubricated Roller is much stronger and has more metal in the wear zones, specially hardened for extra resistance to wear. And bushings, bearings and shafts are larger and stronger and will last longer. These components are *always* bathed in *clean*, heat-dissipating oil (not grease). Dirt just can't get in to accelerate wear—oil can't get out, thanks to the patented Floating Ring Seal. This means you won't be buying as many replacement bushings and shafts at rebuild or roller replacement time.

2. Maintenance Is Eliminated. Lifetime Lubricated Rollers need no servicing until they're finally rebuilt. You don't have to spend any time nor money for lubrication during the rollers' lives.

3. Easier Installation. Snap-on rings hold seals and end collars in place *before* mounting. End collar bolt holes line up easily with track roller frame holes at installation. Your tractors will be on the go much sooner.

See your Caterpillar Dealer. He'll give you the complete facts on the economy of investing in Lifetime Lubricated Rollers . . . for *all* Caterpillar track-type equipment.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

* Suggested consumer prices for these Caterpillar parts

SERVICE TIP: Lifetime Lubricated Rollers need no servicing. But when rebuild time finally comes, keep metal rings matched in original pairs.

CATERPILLAR

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